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HYPERTENSIVE TOXEMIA OF PREGNANCY

PREECLAMPSIA AND ECLAMPSIA

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The subject of hypertension in pregnancy is confused by the use of a multitude of ill defined terms and by the lack of critical analysis of the various types of hypertension that may occur during gestation. We have recently studied the problem and have reported our results in detail elsewhere.[1] Here it is our purpose to present a summary of this work in an effort to clarify somewhat the present status of hypertension in pregnancy. Our study is based on observations of 100 normal pregnant women, 100 patients who presented generalized edema uncomplicated by hypertension during pregnancy and 80 patients with hypertension during pregnancy.

During normal pregnancy, the blood pressure remains well within the normal range [2] of normal nonpregnant adult female subjects. Albuminuria is never a normal finding in pregnancy. The average gain in weight during normal gestation is approximately 21 pounds.[3] This is more than can be accounted for by the weight of the uterine contents alone; hence some of the gain is due, at times, to fat and particularly to the presence of a generalized retention of fluid. Indeed, generalized edema is demonstrable in about 75 per cent of all otherwise normal pregnant women.[4] In the absence of hypertension, our observations indicate that edema is seldom of serious pathologic significance, although it may give rise to headaches, scotomas and, in rare instances, even convulsions and coma.[1] It has no adverse effect on the fetus.[1] The edema cannot be explained solely on the basis of hypoproteinemia, increased venous or capillary pressure, increased capillary permeability, cardiac failure, anemia, vitamin B_1 deficiency, myxedema or excessive ingestion of sodium salts, although many of these factors may at times play an important secondary role. By exclusion, an endocrine or renal cause may be suspected with considerable justification.[5] When this generalized edema is associated with hypertension during pregnancy, it assumes exceeding importance, as will presently be discussed.

TYPES OF HYPERTENSION IN PREGNANCY

Approximately 6 to 9 per cent of normal patients have either hypertension or albuminuria, or both, in the latter half (not in the first half) of pregnancy,[6] and these changes are almost always associated with the development of generalized edema.[1] At the onset, the patient is usually asymptomatic. Headaches, scotomas, nausea, vomiting and drowsiness appear in the cases of more severe involvement. This syndrome is generally known as preeclampsia or, if coma or convulsions supervene, eclampsia. Figure 1 illustrates the typical clinical course of a patient with preeclampsia. The hypertension, albuminuria and edema may subside before delivery, but if these changes persist they always subside soon after delivery. Their disappearance is marked by diuresis and a loss of edema and symptoms, followed by a slower recession of the hypertension and albuminuria.

Patients with prepregnant hypertension of any degree of severity and due to any cause (chronic pyelonephritis, chronic glomerulonephritis, "essential" hypertension and the like) may have an uncomplicated course during pregnancy, a condition which we have referred to as "hypertension uninfluenced by pregnancy." Twenty of our 39 patients who had hypertension or albuminuria before pregnancy failed to have a further increase in blood pressure or albuminuria during pregnancy despite the appearance of generalized edema in two thirds of the patients.[1] The clinical course of a typical case of hypertension uninfluenced by pregnancy is shown in figure 2. This frequent lack of aggravation of hypertension and albuminuria (i. e. lack of toxemia) in hypertensive patients during pregnancy is quite unappreciated by most authors. Although the mother fares well, there is a high incidence of miscarriages and stillbirths in this group.

The remaining number (approximately 50 per cent) of our patients with hypertension which antedated pregnancy developed toxemia of pregnancy, i. e. an accen-

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1. Dexter, Lewis, and Weiss, Soma: Preeclamptic and Eclamptic Toxemia of Pregnancy, Boston, Little Brown & Company, 1941.

2. Hare, D. C., and Karn, M. N.: Investigation of Blood Pressure, Pulse Rate, and Response to Exercise During Normal Pregnancy, and Some Observations After Confinement, Quart. J. Med. **22:** 381 (April) 1929. Simons, E. J., and Rasmussen, C. C.: Blood Pressures During Pregnancy, Labor, and the Puerperium, Minnesota Med. **8:** 303 (May) 1925.

3. Dieckmann, W. J.: The Toxemias of Pregnancy, St. Louis, C. V. Mosby Company, 1941. Dexter and Weiss.[1]

4. Fink, K.: Ursachen und Bedeutung des Hydrops bei schwangeren Frauen, Ztschr. f. Geburtsh. u. Gynäk. **84:** 1 (Sept.) 1921. Gueissaz, E.: Etude clinique sur les oedèmes de la grossesse, Gynéc. et obst. **31:** 239 (March) 1935. Dexter and Weiss.[1]

5. Taylor, H. C., Jr.; Wellen, I., and Welsh, C. A.: Renal Function Studies in Normal Pregnancy and in Toxemia Based on Clearances of Inulin, Phenol Red, and Diodrast, Am. J. Obst. & Gynec. **43:** 567 (April) 1942. Dexter and Weiss.[1]

6. Stander, H. J.: An Analysis of 801 Cases of Toxemias of Pregnancy, New England J. Med. **201:** 458 (Sept. 5) 1929. Page, E. W.: Relation Between Hydatid Moles, Relative Ischemia of the Gravid Uterus, and the Placental Origin of Eclampsia, Am. J. Obst. & Gynec. **37:** 291 (Feb.) 1939. Dieckmann.[20]

tuation of hypertension or albuminuria with fluid retention, with or without symptoms, occurring only in the latter half of pregnancy and subsiding before or soon after delivery. From a clinical, pathologic and laboratory standpoint, this vascular syndrome which was superimposed on a previous hypertension is indistinguishable from the preeclampsia and the eclampsia occurring in patients whose blood pressure and urine were normal before pregnancy. We have called this condition toxemia superimposed on prepregnant hypertension. This condition has been referred to by other authors as "nephritic toxemia," "chronic nephritis," "essential hypertension," "vascular renal disease" and, in its less severe phases, "low reserve kidney," "kidney of pregnancy" and so forth. The clinical course of a patient with toxemia superimposed on prepregnant hypertension is represented in figure 3.

Figure 4 illustrates diagrammatically the various types of hypertension which occur during pregnancy. On rare occasions other types of hypertension may by coincidence have their onset during pregnancy, in which case they resemble the same disease as it occurs in nonpregnant patients. The most striking example of this is acute glomerulonephritis. Because of its rarity, it will not be discussed further.

DEFINITION OF TOXEMIA OF PREGNANCY

The hypertensive toxemia of pregnancy (preeclampsia and eclampsia) may be defined as the appearance in the latter half of pregnancy of (*a*) an abnormal elevation of blood pressure above the prepregnant level (regardless of the presence or absence of hypertensive disease before the onset of pregnancy) or (*b*) an increase above the prepregnant level of albumin in the urine in the absence of other obvious cause, (*c*) generalized edema in association with the foregoing in the majority of cases, and (*d*) a rapid diminution of these abnormalities before or soon after delivery. Symptoms may or may not be present.

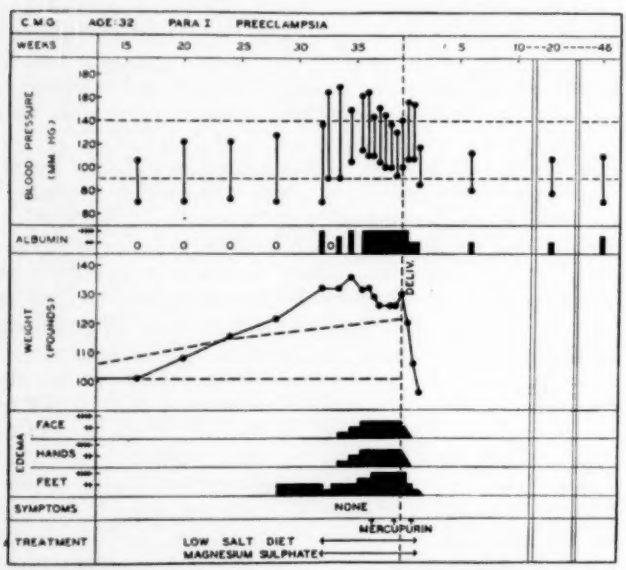

Fig. 1 (C. McG.).—Clinical course of preeclampsia. The patient had normal blood pressure and urine until the thirty-first week of pregnancy, when hypertension, albuminuria and generalized edema appeared. Under treatment, some improvement occurred before delivery, and post partum all abnormalities subsided rapidly except that some albuminuria persisted for at least ten months.

Elevation of blood pressure and albuminuria do not, therefore, necessarily indicate that toxemia is present. A significant increase above preexisting levels in the second half of pregnancy is the basic characteristic. The desirability of obtaining blood pressures and urinalyses before, during the first half and during the second half of pregnancy is apparent.

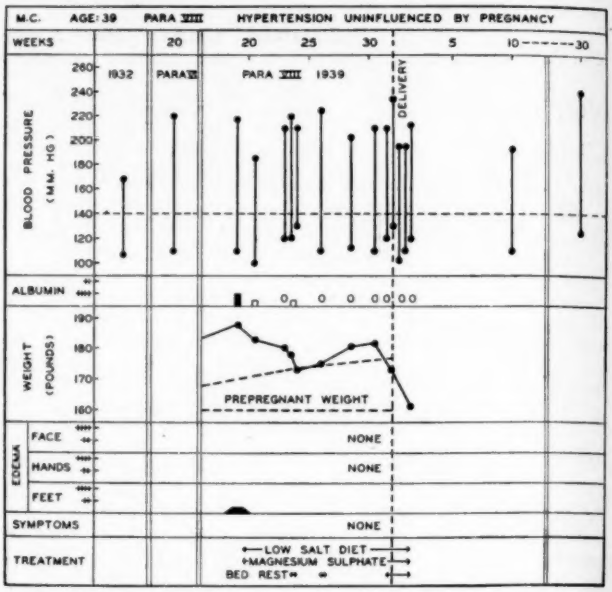

Fig. 2 (M. C.)—Clinical course of hypertension uninfluenced by pregnancy. Despite a severe hypertension before pregnancy, no aggravation occurred during pregnancy or for at least seven months post partum.

CHARACTERISTICS OF TOXEMIA OF PREGNANCY

From the foregoing discussion it is apparent that toxemia of pregnancy is an acute vascular disease entity resembling closely acute glomerulonephritis in its clinical characteristics. Etiologically and pathologically the two diseases differ. The most important factors predisposing to the development of toxemia are hypertensive vascular disease of any cause or any degree of severity and the generalized edema of pregnancy. In our study toxemia developed in approximately one half of those with hypertension before pregnancy. We were unable to predict before its actual onset the hypertensive patients in whom toxemia would develop. It was our impression, however, that those with a low renal reserve or with malignant hypertension were especially prone to it. Generalized edema in pregnancy is usually unaccompanied by toxemia. The onset of toxemia, however, is nearly always characterized by the development of edema or its accentuation. The relation of the vascular manifestations to salt and water retention is striking, as Strauss [7] has demonstrated experimentally, although in the absence of toxemia edema is rarely significant. It should be emphasized, however, that the basis of therapy of toxemia of pregnancy rests on elimination of this retained fluid. Without diuresis, improvement rarely takes place. Less important factors, predisposing to toxemia are primiparity,[8] diabetes,[9] twin pregnancies [10] and perhaps hydatidiform moles.[11]

7. Strauss, M. B.: Observations on the Etiology of the Toxemias of Pregnancy: II. Production of Acute Exacerbation of Toxemia by Sodium Salts in Pregnant Women with Hypoproteinemia, Am. J. M. Sc. **194:** 772 (Dec.) 1937.

8. Hinselmann, H.: Allgemeine Krankheitslehre, in Die Eklampsie, Bonn, Friedrich Cohen, 1924, p. 1. Stander.[30] Irving.[10] Dexter and Weiss.[1]

9. White, Priscilla: Pregnancy Complicating Diabetes, Surg., Gynec. & Obst. **61:** 324 (Sept.) 1935.

10. Irving, F. C.: A Textbook of Obstetrics, New York, Macmillan Company, 1936.

11. Page.[9] Stander.[30] Irving.[10]

Toxemia is peculiar to the second half of pregnancy, the average time of onset in our patients being at the thirty-fourth week. We have assumed that the hypertension and albuminuria are manifestations of the same underlying process, i. e. a vascular disease. The symptoms of toxemia of pregnancy, like those of acute glomerulonephritis, appear to result from a combination of fluid retention and hypertension. In the absence of either one, symptoms are uncommon, or, if they are present, they are usually mild. When both are present, however, cerebral symptoms frequently appear and consist of frontal headaches; scotomas, blurred vision and blindness with or without demonstrable changes in the eyegrounds; nausea, vomiting, abdominal pain; lassitude, drowsiness, twitching, coma, convulsions and a variety of bizarre neurologic manifestations. As in acute nephritis, symptomatic improvement follows diuresis. Physical examination of the patient with toxemia of pregnancy usually reveals a puffy face and hands. There is a striking absence of serous effusions unless cardiac failure supervenes. The eyegrounds are usually normal, although in the more advanced stages of the disease there may be papilledema, retinal detachment, hemorrhages and exudates. Spasm of the retinal arterioles have been described.[12] The heart is usually normal when toxemia is mild, but severe toxemia with pronounced generalized edema is frequently associated with manifestations of cardiac insufficiency. The liver is not enlarged as a result of toxemia. When palpable, it indicates independent disease or cardiac failure.

Patients may improve spontaneously or as a result of therapy before delivery or within twelve to twenty-four hours after delivery. The first definite sign of improvement is diuresis and loss of edema, concomitant with which symptoms disappear rapidly. The blood pressure falls slowly or abruptly, at times returning to its initial level within a few hours and at other times falling slowly over a period of days, weeks or, in rare instances, months. Albuminuria gradually diminishes over the course of days or weeks. Until diuresis has occurred, the patient may become worse.

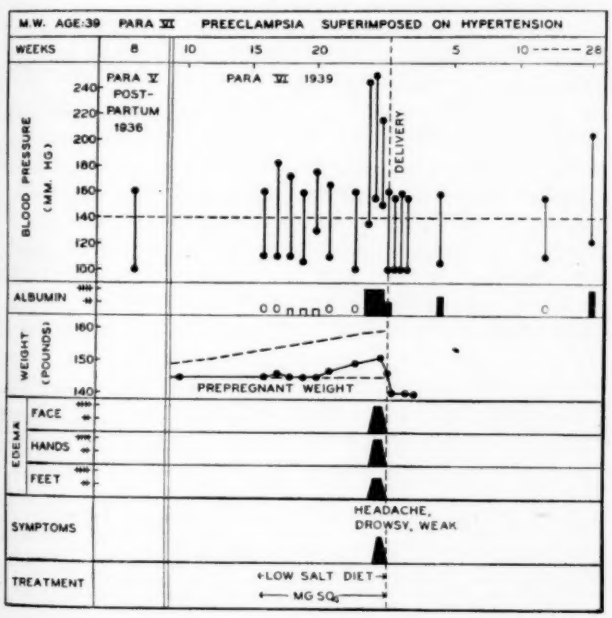

Fig. 3 (M. W.)—Clinical course of preeclampsia superimposed on prepregnant hypertension. Severe hypertension was present before and during the first twenty-two weeks of pregnancy. At the twenty-third week pronounced elevation of blood pressure, copious albuminuria and massive generalized edema appeared, together with drowsiness and headaches. These abnormalities subsided rapidly after delivery.

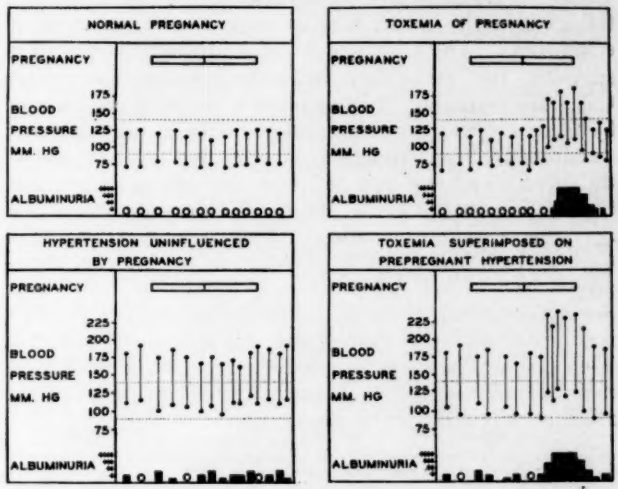

Fig. 4.—Schematic representation of the clinical course of normal and hypertensive patients during pregnancy.

In our experience, postpartum eclampsia always occurs before diuresis is well under way, i. e. before seventy-two hours after delivery. All instances of coma and convulsions observed by us after this time have invariably been attributable to some other puerperal complication.

LABORATORY STUDIES

Our observations have indicated that capillary and venous pressures, circulation time (cyanide method), basal metabolic rate and liver function tests (icteric index, Takata-Ara test and bromsulphalein test) are essentially the same in toxemia as in normal pregnancy, except in cases of eclampsia, in which certain abnormal findings were occasionally found, as might be expected in a state which is nearly terminal. Capillary permeability to proteins was found to be normal, as indicated by a protein content of less than 0.3 Gm. per hundred cubic centimeters in edema fluid. With 2 exceptions, there were no electrocardiographic changes in toxemia. There are essentially normal values for nonprotein nitrogen, blood urea nitrogen, carbon dioxide combining power, chlorides,[13] sodium,[14] blood sugar [15] and blood calcium.[16] Blood uric acid is frequently elevated in the mild and almost always in the severe cases.[13] In eclampsia, in which the organism is in a state of disruption, striking changes in blood chemistry may occur, but these abnormalities have been considered a result rather than the cause of the syndrome.[17] While the plasma proteins are usually lower in toxemia than in

12. Mylius, K.: Spastische und tetanische Netzhautveränderungen bei der Eklampsie, Ber. ü. d. Versamml. d. deutsch. ophth. Gesellsch. **47:** 379, 1929. Wagener, H. P.: Arterioles of the Retina in the Toxemia of Pregnancy, J. A. M. A. **101:** 1380 (Oct. 28) 1933. Schultz, J. F., and O'Brien, C. S.: Retinal Changes in Hypertensive Toxemia of Pregnancy: Report of 47 Cases, Am. J. Ophth. **21:** 767 (July) 1938.

13. Stander, H. J.; Duncan, E. E., and Sisson, W. E.: Chemical Studies on the Toxemias of Pregnancy, Bull. Johns Hopkins Hosp. **36:** 411 (June) 1925. Dexter and Weiss.[1]

14. Taylor, H. C., Jr.; Warner, R. C., and Welsh, C. A.: The Relationship of the Estrogens and Other Placental Hormones to Sodium and Potassium Balance at the End of Pregnancy and in the Puerperium, Am. J. Obst. & Gynec. **38:** 748 (Nov.) 1939.

15. Hurwitz, D.: Toxemias of Pregnancy: A Critical Review of the Recent Literature, New England J. Med. **209:** 1281 (Dec. 21) 1933. Stander, H. J., and Harrison, E. P. H., Jr.: Carbohydrate Metabolism in Eclampsia, Am. J. Obst. & Gynec. **18:** 17 (July) 1929. Krieger, V.: Observations on the Guanidine, Glucose and Calcium Content of Blood in Eclampsia, M. J. Australia **2:** 746 (Dec. 8) 1934.

16. Feinberg, S. M., and Lash, A. F.: The Blood Calcium in Eclampsia, Surg., Gynec. & Obst. **42:** 255 (Feb.) 1926. Krieger.[15]

17. Kydd, D. M.; Oard, H. C., and Peters, J. P.: Acid-Base Equilibrium in Abnormal Pregnancy, J. Biol. Chem. **98:** 241 (Oct.) 1932. Stander, H. J.; Eastman, N. J.; Harrison, E. P. H., Jr., and Cadden, J. F.: The Acid-Base Equilibrium of the Blood in Eclampsia, ibid. **85:** 233 (Dec.) 1929.

normal pregnancy, this is an inconstant finding even in the presence of pronounced generalized edema.[1]

The significance of albumin in the urine has been emphasized. Addis counts [18] reveal a slight increase in the number of erythrocytes, white cells and casts of all sorts. Microscopic hematuria in the sediment centrifuged in the usual way is rare except in cases of eclampsia. Their presence in considerable numbers suggests the possibility of acute glomerulonephritis. Casts are common. Pyelonephritis, recently emphasized by Peters,[19] was an uncommon finding in our cases.

Although renal function as indicated by our use of the urea clearance test at times showed a depression of function in the acute stages of severe toxemia, this was not a regular finding. This is in keeping with observations by others.[20] Recent studies of renal clearances in several laboratories [21] have indicated that during the acute phase of toxemia the renal blood flow is normal and the glomerular filtration is decreased. This change has been attributed to the thickened basement membrane of the glomerulus or to spasm of the afferent arteriole of the glomerulus.

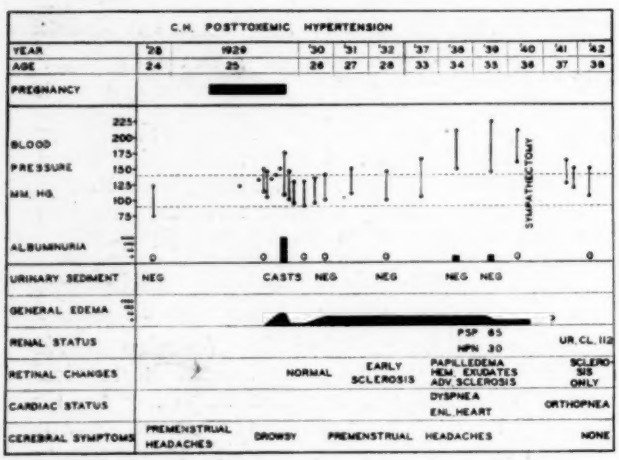

Fig. 5 (C. H.).—Clinical course of post-toxemic hypertension. Previous to pregnancy in 1929, blood pressure and urine were normal. Toxemia appeared at the twentieth week and persisted until the thirtieth week, at which time labor was induced. Post partum a low grade hypertension persisted and became progressively more severe after 1937. A renal biopsy at the time of sympathectomy by Dr. Reginald Smithwick in 1941 revealed advanced nephrosclerosis.

Blood guanidine is not uniformly elevated in toxemia, and when it is it follows rather than precedes the rise in blood pressure.[24] The present status of the role played in toxemia of the anterior and posterior pituitary hormones, thyroid and ovaries has been reviewed elsewhere.[1] Although indirect evidence is suggestive that an endocrine abnormality exists and may ultimately be demonstrated to be responsible for the disturbance in water metabolism and in the vascular system, too little is known of the state of the endocrine system in toxemia at the present time to come to any definite conclusions concerning the role it may play in its production. To our knowledge, the excretion of adrenal cortical hormones has not been studied in toxemia.

Thus the laboratory has as yet yielded little insight into the actual mechanism and etiology of toxemia of pregnancy. The eternal search for some toxin, from which the syndrome derives its name, has shed little light on the disorder.

SEQUELAE

A high incidence of spontaneous prematurity, stillbirths and neonatal deaths occurs in toxemia of pregnancy. In preeclampsia without preceding hypertension, the fetal mortality has been reported to vary between 5 per cent in the mild and 25 per cent in the severe cases,[25] while in those with preexistent hypertension it has varied from 12 per cent in the mild to 69 per cent in the severe.[26] The studies of Neugarten [27] and Tyson and Bowman [28] showed that, provided the fetus successfully survived the neonatal period, there were no demonstrable ill effects later from preeclampsia and eclampsia. We did not detect hypertension or water retention in the newborn babies of toxemic and edematous mothers.[1]

The maternal mortality from preeclampsia is but a fraction of 1 per cent in most series that have been reported.[29] In eclampsia, the maternal mortality varies greatly from clinic to clinic but it approximates 20 per cent in the country at large.[30]

The late effects of toxemia of pregnancy on the mother have received the attention of only a few observers but merit emphasis. The careful follow-up studies of Herrick and Tillman,[31] Dieckmann and Brown,[32] Reid and Teel [33] and others indicate that approximately 25 per cent of those with normal prepregnant blood pressure who develop toxemia during pregnancy are left with a permanent postpartum hypertension. It is also recognized [34] that a similar percentage of hyper-

18. Elden, C. A.; Sinclair, F. D., Jr., and Rogers, W. C.: The Effect of the Toxemias of Pregnancy on Renal Function, J. Clin. Investigation **15**: 317 (May) 1936.

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21. Chesley, L. C.; Connell, E. J.; Chesley, E. R.; Katz, J. D., and Glissen, C. S.: The Diodrast Clearance and Renal Blood Flow in Toxemias of Pregnancy, J. Clin. Investigation **19**: 219 (Jan.) 1940. Chesley, L. C.: The Question of Glomerular Damage Following Toxemia of Pregnancy, Am. J. Obst. & Gynec. **42**: 229 (Aug.) 1941. Corcoran, A. C., and Page, I. H.: Renal Function in Late Toxemia of Pregnancy, Am. J. M. Sc. **201**: 385 (March) 1941. Welsh, C. A.; Wellen, I., and Taylor, H. C., Jr.: Renal Blood Flow, Filtration Rate, and Tubular Excretory Mass in Patients with Specific Toxemia of Pregnancy, J. Clin. Investigation **20**: 438 (July) 1941. Wellen, I.; Welsh, C. A., and Taylor, H. C., Jr.: The Filtration Rate, Effective Renal Blood Flow, Tubular Excretory Mass and Phenol Red Clearance in Specific Toxemia of Pregnancy, ibid. **21**: 63 (Jan.) 1942. Dill, L. V.; Isenhour, M. A.; Cadden, M. A., and Schaffer, N. K.: Glomerular Filtration and Renal Blood Flow in the Toxemias of Pregnancy, Am. J. Obst. & Gynec. **43**: 32 (Jan.) 1942. Taylor, Wellen and Welsh.[3]

22. Footnote deleted on proof.

23. Footnote deleted on proof.

24. Stander, H. J.: Blood Guanidine Base Concentration in Eclampsia, Am. J. Obst. & Gynec. **23**: 373 (March) 1932. Andes, J. E.; Andes, E. J., and Myers, V. C.: Guanidine-like Substances in the Blood: III. Blood Guanidine in Normal Pregnancy, Toxemias of Pregnancy, and Cirrhosis of the Liver, J. Lab. & Clin. Med. **23**: 9 (Oct.) 1937. Krieger.[15]

25. Dieckmann, W. J., and Brown, I.: Hypertension and Pregnancy, Am. J. Obst. & Gynec. **36**: 798 (Nov.) 1938. Reid, D. E., and Teel, H. M.: Nonconvulsive Pregnancy Toxemias: Their Relationship to Chronic Vascular and Renal Disease, ibid. **37**: 886 (May) 1939. Peckman, C. H.: The Fetal Mortality in the Toxemias of Pregnancy, J. A. M. A. **101**: 1608 (Nov. 18) 1933. Tillman, A. J. B., and Watson, B. P.: The Fetal Mortality in Different Types of Toxemia, Am. J. Obst. & Gynec. **29**: 19 (Jan) 1935.

26. Corwin, J., and Herrick, W. W.: The Toxemias of Pregnancy in Relation to Chronic Cardiovascular and Renal Disease, Am. J. Obst. & Gynec. **14**: 783 (Dec.) 1927. Dieckmann and Brown.[25] Peckman.[25] Tillman and Watson.[25]

27. Neugarten, L.: Ueber das Schicksal der Kinder eklamptischer Mütter, Zentralbl. f. Gynäk. **49**: 1938 (Aug. 29) 1925.

28. Tyson, R. M., and Bowman, J. E.: Offspring of Eclamptic and Preeclamptic Mothers, Arch. Pediat. **48**: 270 (April) 1931.

29. Cruickshank, J. N.; Hewitt, J., and Couper, K. L.: The Toxemias of Pregnancy: A Clinical and Biochemical Study, Medical Research Council, Special Report Series 117, 1927. Reid and Teel.[25] Dieckmann and Brown.[25]

30. Stander, H. J.: Toxemias of Pregnancy, Medicine **8**: 1 (Feb.) 1929.

31. Herrick, W. W., and Tillman, A. J. B.: Toxemia of Pregnancy: Its Relation to Cardiovascular and Renal Disease; Clinical and Necropsy Observations with a Long Follow-Up, Arch. Int. Med. **55**: 643 (April) 1935.

32. Dieckmann, W. J., and Brown, I.: Do Eclampsia and Preeclampsia Cause Permanent Vascular Renal Pathology? Am. J. Obst. & Gynec. **37**: 762 (May) 1939.

33. Teel, H. M., and Reid, D. E.: Eclampsia and Its Sequelae: A Clinical Follow-Up of all Cases at the Boston Lying-In Hospital Over a Twenty-Year Period, Am. J. Obst. & Gynec. **34**: 12 (July) 1937. Reid and Teel.[25]

34. Heynemann, Theodor: Spätfolgen der Eklampsie und ihrer Vorstadien unter besonderer Berücksichtigung der Nierenveränderungen, Zentralbl. f. Gynäk. **58**: 3010 (Dec. 22) 1934. Herrick and Tillman.[31] Dieckmann and Brown.[32]

tensive patients who develop toxemia during pregnancy have a higher blood pressure and more albumin in the urine after their pathologic pregnancy than before, which again emphasizes the permanently harmful action of toxemia on the mother.

In a careful follow-up study, Reid and Teel [33] found that permanent vascular disease developed with far greater frequency in those whose toxemias had been mild than in those who had had eclampsia. From our own observations, we are in accord with their conclusions. It appears that the duration of the vascular disorder during pregnancy is of greater importance than its severity in giving rise to permanent vascular disease. We have advocated termination of pregnancy after three weeks of conservative therapy of toxemia in order to avoid this late vascular damage. For the same reason, Peckham [35] has recently suggested terminating pregnancy after a toxemia of four weeks' duration.

Although after a toxemic pregnancy hypertension and albuminuria usually disappear within a few days or a few weeks, they may persist for as long as a year and then disappear permanently. Such cases are not rare. These cases merge imperceptibly into those in which the hypertension or albuminuria are permanent. The course is then one of chronic progression indistinguishable from other types of chronic hypertensive disease such as chronic glomerulonephritis or benign or malignant "essential" hypertension. Figure 5 is illustrative of a typical case of post-toxemic hypertensive vascular disease. Elsewhere we [36] have discussed in detail the clinical course of post-toxemic hypertension.

HISTOPATHOLOGY OF TOXEMIA OF PREGNANCY

In toxemia, the main morphologic changes occur in the kidney, liver and placenta, although inconstant changes have been observed in many other organs.

The earliest changes in toxemia occur in the kidney rather than in the liver, as is usually stated. Renal lesions are diffuse and are primarily degenerative in character. The term glomerulonephrosis, which has been applied to this condition by Fahr,[37] would seem the most suitable. The epithelial cells of the convoluted tubules are swollen and contain numerous hyaline droplets. Varying amounts of fat are present. The epithelium of the glomerular tufts shows degenerative changes similar to that of the tubular epithelium. The basement membrane of the tufts is thickened to a variable degree owing to reduplication. The glomerular capillaries appear bloodless in most cases but occasionally congested (fig. 6). An increase in the number of endothelial cells of the capillaries of the tufts is occasionally seen. In several instances acute sclerotic changes, such as were described by Fahr [37] and Bell,[38] have been observed in the afferent arteriole. Similar changes have been observed by us [1] and by others [39] in cases of pre-eclampsia but not in pregnant women dying from causes other than toxemia.[40]

Liver lesions in cases of eclampsia are inconstant and were present in only 13 of 25 cases studied by us. Liver changes, as described by Fahr [37] and others, are characterized by capillary dilatation, hemorrhage, thromboses, stasis, hydropic and fatty degeneration and necrosis of hepatic cells and lymphocytic infiltration, usually at the periphery of the lobule. Occasionally these changes are focal or are located in the midzone of the central portion of the lobule.

Infarcts are often present in the placenta. Microscopically, the placental lesions consist primarily of a premature aging process.[41] The normal full term placenta shows a certain amount of syncytial degeneration. Quantitatively, this normal aging process involves

Fig. 6.—Renal glomerulus in eclampsia. Note thickened basement membrane, anemia, narrowing of capillaries and degenerative tubular epithelium. Aniline blue stain. Reduced from a photomicrograph with a magnification of 600 diameters.

only 10 per cent to 50 per cent of the small villi at term. In toxemia, however, the extent and severity of changes in the syncytium are greater. In severe cases, all the small villi may be involved. This difference is all the more significant because most of the toxemic placentas examined were delivered prematurely.

TREATMENT

The treatment of toxemia of pregnancy is prophylactic and therapeutic.

Prophylaxis.—Perhaps the greatest strides in the control of toxemia have been in its prevention. Prophylactic treatment should consist in recognizing those

35. Peckham, C. H.: Time of Onset and Duration of the Toxemias of Late Pregnancy in Relation to the Development of Permanent Vascular Damage, Am. J. Obst. & Gynec. **42:** 638 (Oct.) 1941.

36. Golden, A.; Dexter, Lewis, and Weiss, Soma: Vascular Disease Following Toxemia of Pregnancy (Preeclampsia and Eclampsia): Observations on Its Clinical Course, Arch. Int. Med., to be published.

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39. Kellogg, F. S.: Toxemias of Pregnancy, Am. J. Surg. **35:** 300 (Feb.) 1937. Heynemann, T.: Der anatomische Befund in präeklamptischen Stadium der Gestationseklampsie, Virchows Arch. f. path. Anat. **254:** 493, 1925. Page, E. W., and Cox, A. J.: Renal Changes Following Toxemias of Late Pregnancy, West. J. Surg. **46:** 463 (Sept.) 1938. Bell.[38]

40. Baird, D., and Dunn, J. S.: Renal Lesions in Eclampsia and Nephritis of Pregnancy, J. Path. & Bact. **37:** 291 (Sept.) 1933. Dexter and Weiss.[1]

41. Tenney, Benjamin, Jr., and Parker, Frederic, Jr.: The Placenta in Toxemia of Pregnancy, Am. J. Obst. & Gynec. **39:** 1000 (June) 1940.

patients in whom toxemia is prone to occur, i. e. those with prepregnant hypertension, and in preventing if possible the development of generalized edema, which is the most frequent sign found by us to precede or accompany the onset of toxemia. Periodic examination of all pregnant women beginning as early in pregnancy as possible should include weight, blood pressure, urinalysis and examination for the presence of edema. All patients should be instructed to report at once the appearance of generalized edema or toxemic symptoms. With the appearance of edema, more than the usual supervision should be given even though in most cases it is by itself innocuous. The edema is preventable in many instances by maintaining adequate nutrition with a diet containing 100 Gm. or more of protein, a low value of salt, a high carbohydrate level and a caloric value of about 2,000. The diet should include lean meats and eggs with abundant fruits and vegetables. Fats, with the exception of a moderate amount of butter, should be eliminated. When patients adhere to a diet of low salt content there is no need to restrict fluid intake. Sodium bicarbonate and sodium containing preparations should not be used for heartburn. Preparations devoid of sodium such as magnesia magma or "amphojel" should be prescribed in the treatment of this symptom. In the more resistant cases, diuretics are employed. Potassium chloride in 2 Gm. doses three to four times a day, ammonium chloride in 1 Gm. capsules six times a day for three days and repeated after an interval of three days,[42] or magnesium sulfate 8 Gm. daily by mouth may be beneficial in promoting loss of edema. Mercurial diuretics have met with little success in our hands. If the edema is pronounced and symptoms exist, the patient should be put to bed for seven to ten days and placed on a 1,200 to 1,500 calory diet composed mainly of fruit juices, sugar and skim milk.

Treatment of Preeclampsia.—The discovery of hypertension or albuminuria with or without edema in the first half of pregnancy indicates that vascular or renal disease exists independently of pregnancy (hypertension uninfluenced by pregnancy). Such patients should be watched with extreme care for the development of edema and toxemia. Preeclampsia is signaled by the appearance of a rise of blood pressure or an increase in albuminuria during the second half of pregnancy. When preeclampsia develops, we advocate that the patient should either be hospitalized or be put to bed at home and visited daily. Aside from bed rest and sedation for adverse symptoms, practically all effective therapy in preeclampsia (and eclampsia) consists in producing water elimination, whether by purges, restriction of salt and sodium bicarbonate in the diet, administration of diuretics or, finally, evacuation of the uterus. The dietary and fluid regimen and the administration of diuretics described in the preceding paragraph should be followed. If gastric disturbances exist, a diet of fruit juices and skim milk suffices. Daily observations of weight, blood pressure, urine, edema and symptoms are essential for judging the progress of the disorder. Diuresis usually results from this regimen. Cerebral, visual and gastrointestinal symptoms can usually be controlled by sedation, preferably magnesium sulfate (10 cc. of a 25 per cent solution intramuscularly) or the barbiturates (e. g. sodium amytal 0.2 Gm. subcutaneously). If the condition of the patient becomes worse, as evidenced by failure of diuresis or by maintained or rising blood pressure, albuminuria and other symptoms, evacuation of the uterus under the most favorable conditions offers the only consistently effective method of treatment. Before undertaking delivery all available general measures should be used in order to improve the bodily state of the patient. Accouchement forcé and cesarean section should be avoided as far as possible. We advocate rupture of the membranes or insertion of a Voorhees bag if the condition of the cervix warrants. Should the hypertension and albuminuria, even if slight, persist for a period of three weeks, we advocate considering termination of pregnancy as a safeguard against the development of permanent postpartum hypertension or albuminuria.

Treatment of Eclampsia.—The appearance of coma or convulsions (eclampsia) or symptoms suggesting its approach are of considerable gravity to both mother and fetus. Therapeutic principles to be followed should consist in (1) general measures, (2) control of symptoms, (3) promotion of diuresis, (4) control of blood pressure and (5) possible evacuation of the uterus.

1. General Measures: These consist of bed rest in a warm, quiet, darkened room with constant observation. Recording of temperature and urine volume (by retention catheter) every two hours and recording of pulse, respiration and blood pressure every half hour should be maintained. Nothing should be given by mouth until the patient is conscious. Oxygen is indicated to combat cyanosis. A gentle soapsuds enema is given for elimination.

2. Control of Symptoms: For convulsions or for preconvulsive symptoms, heavy sedation is required. The three groups of sedatives most widely and successfully used are magnesium sulfate, barbiturates and chloral hydrate. The use of these sedatives as well as of morphine, veratrum viride and lumbar puncture has been described in detail.[1]

3. Diuresis: Our observations have indicated clearly that the most reliable sign of improvement is diuresis, and until diuresis occurs improvement rarely takes place. For this reason an inlying catheter with a two hourly recording of urinary output is serviceable. Pulmonary edema, cardiac decompensation, water intoxication, acidosis and other manifestations are secondary to the water retention and progressive renal shutdown. Should these complications develop, therapy should be directed toward their relief, but it is usually of little avail while oliguria or anuria persists. Venesection and plasmapheresis at this time increase rather than lessen the oliguria. Renal decapsulation is usually a harmful procedure. The administration of saline solution enhances edema formation and is contraindicated, as is also the administration of large amounts of parenteral fluids in the presence of edema.

Many factors enter into the excretory function of the kidney, two of the most important being maintenance of an adequate osmotic pressure of the blood and of an adequate blood pressure (see next paragraph). Diuresis may be aided and abetted by the slow administration intravenously of 50 cc. of 50 per cent dextrose. Transfusion or administration of concentrated protein solutions is the most important measure for promoting diuresis. It must be given slowly (500 cc. in two to three hours) with the patient in the orthopneic position in order to avoid pulmonary congestion.

4. Control of Blood Pressure: Although an extreme hypertension in eclampsia is of danger to the patient,

42. The administration of potassium and ammonium salts to patients with nitrogen retention is definitely contraindicated.
43. Footnote deleted on proof.
44. Footnote deleted on proof.

it has been our experience that the earliest sign of impending disaster is almost always an insidious, progressive fall in arterial blood pressure terminating in shock and death. This fall in blood pressure is often due in part to excessive use of sedatives, in part to indiscriminate blood letting and in part to the disintegration of the body as a result of the disease. Only too often are sedatives administered with the primary object of creating a hypotension rather than of controlling the convulsive seizure. This has already been emphasized. Venesection has been in vogue for several centuries. A rational consideration of its indications, however, reveals that it should be reserved for pulmonary edema alone. Maintenance of the blood pressure at normal or somewhat hypertensive levels is important. The blood pressure is more easily and reversibly controlled by the administration of magnesium sulfate or other sedatives given intravenously or intramuscularly than by venesection. Should the blood pressure fall to hypotensive levels, transfusion or administration of concentrated protein solutions is the most important measure for checking the progress of circulatory collapse. Although venesection may lower blood pressure, transfusion does not raise blood pressure above the normal level. If the process advances to the stage of outright shock with low blood pressure, pulmonary congestion, gasping respirations, cyanosis, coma, cold clammy extremities and the like, the prognosis is usually grave because irreversible changes have set in. Transfusion and cardiac and respiratory stimulants such as caffeine, nikethamide, digitalis and hypertonic dextrose and sucrose may be of some help.

5. Evacuation of the Uterus: When all measures fail, evacuation of the uterus is invariably followed by relief, provided the process has not entered an irreversible stage. The astonishing disappearance of the symptoms and signs after delivery is truly dramatic. In the majority of cases of eclampsia there is improvement within twelve to eighteen hours of the institution of good medical therapy. An early effort should be made, however, to promote delivery. Unless the process has advanced to the stage of irreversibility, diuresis followed by other signs of improvement set in usually between twelve and twenty-four hours of delivery. The method by which pregnancy is terminated depends on many factors. If the cervix is "ripe," labor can usually be successfully induced by rupture of the membranes or insertion of a bag. Eclamptic patients are not good anesthetic or operative risks. We favor as the most satisfactory therapy the so-called middle course treatment which condemns routine accouchement forcé and cesarean section and which advocates improving the general condition and carrying the patient along until spontaneous delivery or delivery enhanced by dilation of the cervix is feasible.

COMMENT

Considerable mystery has surrounded the nature of the hypertensive toxemia of pregnancy.

It is a disease entity peculiar to the latter half of pregnancy with a clearcut pattern of characteristics which set it apart quite distinctly from other types of hypertension clinically and pathologically. Its closest analogue in the nonpregnant is acute glomerulonephritis, from which of course it differs etiologically and pathologically. Both represent, however, an acute type of vascular disease characterized by hypertension, albuminuria and water retention. In each there is a diffuse involvement of the glomeruli of the kidney. Both may leave irreparable renal damage and permanent vascular disease in their wake. Like acute glomerulonephritis, toxemia of pregnancy differs strikingly from the chronic forms of hypertensive vascular disease ("essential" hypertension, chronic glomerulonephritis, and so forth).

Post-toxemic hypertension and albuminuria are usually attributed to the persistence of a previously latent hypertension which has been made apparent by pregnancy. With this statement we are not in agreement. Evidence reviewed elsewhere [46] indicates to us that toxemia per se initiates the hypertensive process which becomes permanent after pregnancy. Clinically, this post-toxemic hypertension differs little if at all from the syndromes of benign or malignant nephrosclerosis of different etiologies. At autopsy, we have not detected any characteristic lesion in the kidneys of these patients. Indeed it is a common observation that the chronic effects of various types of initial renal lesions are identical or at least similar. The histologic lesion common to all is that of benign or malignant nephrosclerosis.

Many investigators have described animal syndromes which bear a superficial resemblance to human toxemia. On close examination, however, there are distinct differences.[1] Dill and his co-workers,[47] for example, have reported that experimental renal hypertension may be induced in pregnant rabbits and dogs with more ease than in nonpregnant animals and that delivery causes a distinct improvement in the hypertension. Their work has not been confirmed by Dawson, Cressman and Blalock [48] in dogs. The syndrome produced in the rabbits resembled malignant hypertension with renal insufficiency rather than toxemia of pregnancy. Furthermore, when pregnancy occurs in animals hypertensive from renal ischemia, the blood pressure usually falls somewhat [49] as in human beings.[50] It would be fortunate if toxemia of pregnancy could be induced in animals, because it would open up a whole new field of investigation for the better understanding of the human disease.

Toxemia of pregnancy has been referred to as the "disease of theories," as indeed it is, which only indicates our lack of knowledge of its etiology. Space does not warrant more than a few brief etiologic observations here. More complete discussion will be found elsewhere.[1] It is apparent, however, that toxemia is not due primarily to uremia, liver insufficiency, hypoglycemia, electrolyte imbalance, hypocalcemia, guanidine intoxication, pyelonephritis, hypothyroidism, overactivity of the posterior pituitary gland or hypoproteinemia. Conclusive evidence is still lacking that a specific "toxin" is responsible for toxemia. Too little is known of hormone abnormalities in toxemia to evaluate the role they may play in its causation. From our own observations,[1] it appears that toxemia cannot be attributed to the fetus or to the uterine mass pressing

45. Footnote deleted on proof.
46. Dexter and Weiss.[1] Golden and Dexter.[36]
47. Dill, L. V., and Erickson, C. C.: Eclampsia-like Syndrome Occurring in Pregnant Dogs and Rabbits Following Renal Artery Constriction, Proc. Soc. Exper. Biol. & Med. **39:** 362 (Nov.) 1938. Dill, L. V.; Isenhour, C. E., and Cadden, J. F.: The Effect of Quantitative Reduction of Renal Blood Flow on the Pregnant Rabbit, J. Clin. Investigation **18:** 641 (Nov.) 1939. Goldblatt, Harry, in discussion on paper by Erickson, C. C., and Dill, L. V.: Observations on the Effects of Renal Ischemia in Pregnant Dogs and Rabbits, Am. J. Path. **15:** 621 (Sept.) 1939. Dill, L. V., and Erickson, C. C.: Effect of Constriction of the Renal Arteries in Pregnancy and in Certain Endocrine States of Rabbits, Arch. Path. **31:** 68 (Jan.) 1941.
48. Dawson, J. R., Jr.; Cressman, R. D., and Blalock, Alfred: Experimental Hypertension and Pregnancy in Dogs, Am. J. Path. **17:** 31 (Jan.) 1941.
49. Corbit, J. D., Jr.: The Effect of Pregnancy on Experimental Hypertension in the Rabbit, Am. J. M. Sc. **201:** 876 (June) 1941. Goldblatt.[47] Dawson, Cressman and Blalock.[48]
50. Dexter and Weiss.[1] Hare and Karn.[2] Simons and Rasmussen.[2]
51. Footnote deleted on proof.
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on adjacent structures such as ureter or renal artery. Evidence has been presented indicating the placenta as playing the primary role. The method by which the placenta produces this dyscrasia is not known.

SUMMARY

1. Results of a study of 100 normal pregnant patients, 100 pregnant patients with generalized edema and 80 patients with hypertension during pregnancy were correlated with and amplified by salient reports in the literature.

2. Approximately 75 per cent of all pregnant patients have easily demonstrable generalized edema which is only rarely of pathologic significance to the mother or fetus in the absence of hypertension and albuminuria. Its cause is unknown.

3. More than 90 per cent of previously normal patients have no vascular complications during pregnancy. Approximately 50 per cent of previously hypertensive or albuminuric patients suffer no aggravation of their hypertension or albuminuria during pregnancy, regardless of the degree of hypertension or albuminuria before pregnancy. Since this lack of complications during pregnancy in hypertensive patients is not generally appreciated, we have referred to it as "hypertension uninfluenced by pregnancy." Although the mother fares well, there is a high incidence of miscarriages and stillbirths in this group.

4. Six to 9 per cent of previously normal patients have hypertension or albuminuria in the latter half of pregnancy, a syndrome known as toxemia (preeclampsia or, if coma or convulsions occur, eclampsia). Fifty per cent of our previously hypertensive patients had toxemia in the latter half of pregnancy. We were unable to predict which hypertensive patients would have toxemia on becoming pregnant.

5. Toxemia of pregnancy is an acute vascular disorder of the latter half of pregnancy which disappears before or soon after delivery. Clinically, it resembles closely acute glomerulonephritis in respect to hypertension, albuminuria and generalized edema; frequently there is development of permanent vascular disease subsequently.

6. The most important factors predisposing to the development of toxemia are generalized edema during pregnancy and prepregnant hypertensive vascular disease.

7. While the immediate maternal mortality in preeclampsia is almost negligible, in eclampsia it is high in the country at large.

8. There are no late effects of toxemia on the fetus. Permanent hypertensive cardiovascular renal disease of the mother occurs in approximately 25 per cent of patients with toxemia of pregnancy.

9. Post-toxemic hypertension and albuminuria are conditioned more by the duration of toxemia during pregnancy than by its severity. We advocate termination of pregnancy when toxemia, no matter how mild, has persisted for three weeks in spite of conservative therapy.

10. Post-toxemic hypertension differs in no essential details clinically or pathologically from other types of chronic hypertensive disease. At postmortem examination the characteristic lesions consist of nephrosclerosis.

11. Pathologically, the most characteristic and constant lesions in toxemia are in the kidney and consist of a glomerulonephrosis (Fahr). Liver lesions are inconstant but when present consist typically of lesions in the periphery of the lobule. Placental lesions are characterized by infarction and premature syncytial degeneration.

12. There is danger in venesection and excessive sedation. Interruption of pregnancy after three weeks of conservative therapy to prevent the occurrence of permanent vascular disease in the mother is advocated.

13. The etiology of toxemia of pregnancy is unknown, although evidence points to the placenta as being primarily responsible for the condition.

CONTINUOUS CAUDAL ANESTHESIA OR ANALGESIA

A CONSIDERATION OF THE TECHNIC, VARIOUS USES AND SOME POSSIBLE DANGERS

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To the many recent advances in the rapidly expanding field of anesthesiology, another new method has been added, namely continuous caudal anesthesia or analgesia. The method was introduced as a new means of producing obstetric anesthesia and analgesia but it also has possibilities as a method of anesthesia for certain surgical operations.

Throughout the ages, physicians have been attempting to arrive at a method of anesthesia which would render labor and delivery painless without increasing the hazard to either mother or child. Few, if any, of the methods heretofore developed have even remotely satisfied these three demands. There are certain indications which lead many physicians to believe that continuous caudal anesthesia will meet these demands in most cases. It is only natural that the apparent answer to such an important problem should create intense interest among both the medical profession and the public.[1] Many successful results have been reported up to this time and the use of the method is increasing rapidly.[2]

Although we are convinced that the principles of this new method are sound and that its use will continue to expand, we wish to point out to those who contemplate using the method that the technic may be difficult and that it may be accompanied by certain potential dangers and complications. If continuous caudal anesthesia is to be employed with safety, the anesthetist must be both adept in the technic of the method and fully aware of all the potentialities involved. In this paper we wish to emphasize the technic of the method together with its potential hazards as well as its desirable features.

DEVELOPMENT OF THE METHOD

Continuous caudal anesthesia has been founded on a number of earlier methods, among which are caudal block,[3] transsacral block,[4] high caudal block,[5] peridural block and combinations of these methods.

From the Section on Anesthesia, Mayo Clinic.

Because of lack of space, this article is abbreviated here. The complete article appears in the authors' reprints.

1. Fishbein, Morris: A New Step Toward Painless Childbirth, Your Life **12:** 44-47 (Feb.) 1943. Hingson, R. A., and Southworth, J. L.: Continuous Caudal Anesthesia, Am. J. Surg. **58:** 93-96 (Oct.) 1942.
2. Hingson, R. A.: Personal communication to the authors.
3. Lundy, J. S.: Clinical Anesthesia, Philadelphia, W. B. Saunders Company, 1942.
4. Lundy, J. S.: A Method of Producing Block Anesthesia of the Sacral Nerves, Am. J. Surg. **4:** 262-270 (March) 1928.
5. Campbell, W. C.: Sacral Block and High Caudal Block Anesthesia, Proc. Staff Meet., Mayo Clin. **10:** 667-672 (Oct. 16) 1935. Lundy, J. S.: High Caudal Block Anesthesia, S. Clin. North America **15:** 1271-1275 (Oct.) 1935.

Continuous caudal anesthesia was originated and developed by Edwards and Hingson [6] and the preliminary report of their results appeared in September 1942. Its preliminary trial in October 1941 involved its use for several surgical procedures on the perineum and lower extremities. Its first obstetric application was carried out by Hingson and Edwards on Jan. 6, 1942. Up to the present they have used the method and studied the results in 600 cases. In their earlier cases Hingson and Edwards employed a type of equipment similar to that which Lemmon [7] used for continuous spinal anesthesia, namely a malleable needle of the Lemmon type to which was attached an extension tubing to permit the administration of additional doses of the local anesthetic solution throughout the course of labor and delivery. Subsequently they modified the equipment somewhat (fig. 1).

After a preliminary trial of the method of Hingson and Edwards we devised an alternative technic (fig. 2). This involved the use of a ureteral catheter inserted into the caudal canal through a large caliber needle and through which the local anesthetic solution was injected. This apparatus was developed with the idea of preventing possible breakage of and trauma from a semirigid needle in the caudal canal and to help permit greater freedom of movement of the obstetric patient during the course of her labor without the hazards of trauma or breakage of the needle.

After instituting this technic and using it in a number of cases we learned that Manalan of Indianapolis had employed a ureteral catheter in a number of cases to produce anesthesia and analgesia for obstetric delivery, although not as a continuous method for the relief of pain during the course of labor.[8] Thus, as often happens in medical development, two similar technics

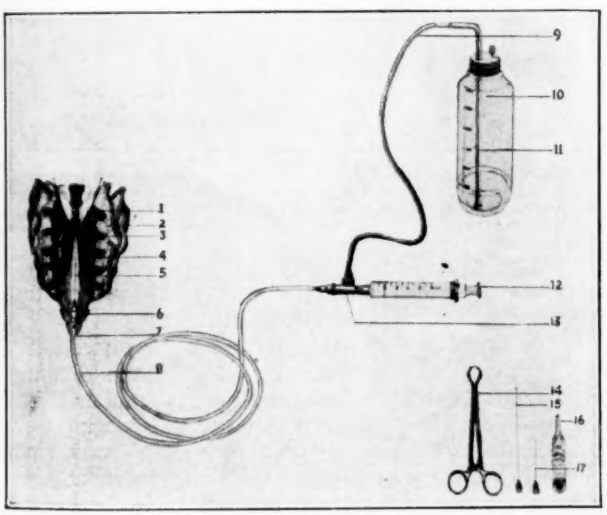

Fig. 1.—Diagrammatic representation of the Hingson and Edwards apparatus for continuous caudal anesthesia, showing the relationship of the needle to the sacral nerves in the caudal canal (with authors' permission).

were evolved independently by Manalan and ourselves. Manalan [9] employed this method of anesthesia and analgesia in obstetric delivery in 46 cases from Aug. 13, 1940 to Nov. 15, 1941. The preliminary report of his work appeared in October 1942.

We have used and are continuing to use the method of Hingson and Edwards and the one developed by us in both obstetric and surgical cases. Both methods have certain advantages and certain disadvantages according

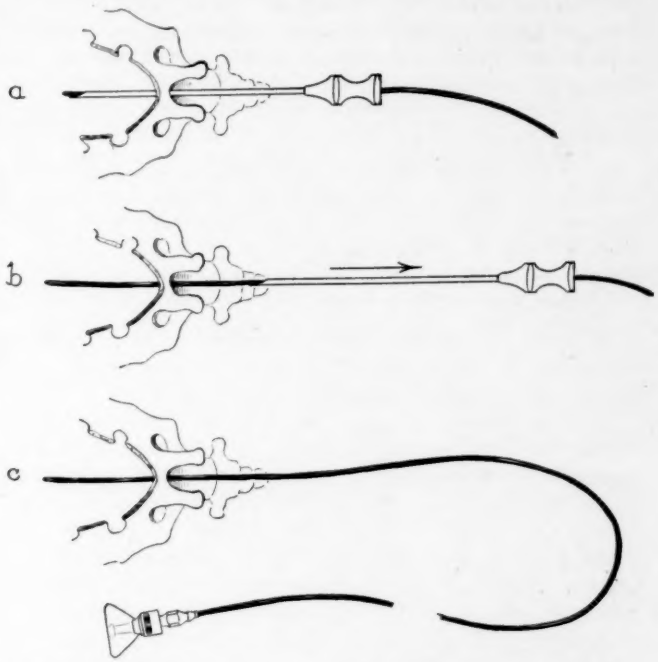

Fig. 2.—Diagrammatic representation of the relationship of the 13 gage needle and that of the catheter to the caudal canal: *a*, needle in place; catheter inserted through needle so that point of catheter is flush with the point of needle; *b*, catheter held in place and needle being withdrawn; *c*, catheter in place; needle has been removed.

to our present concepts. Throughout the following pages the technic of both methods will be described. Neither of these methods should be attempted by physicians who are not experienced in the use of caudal-sacral block anesthesia. It is suggested that those who contemplate the use of the method should first familiarize themselves with the technical features of the method in general. Tuohy [10] has applied the catheter technic to continuous spinal anesthesia in a limited number of cases and feels that this method may be applicable in certain cases in which continuous spinal anesthesia is indicated.

Technic.—The needle is inserted into the midline of the caudal canal through the sacral hiatus, which is covered by the sacrococcygeal ligament. Its point is advanced to the level of the third sacral foramen and never higher than the level of the second sacral foramen, owing to the possibility of puncturing the dural sheath.

Anesthetic Agents.—Various local anesthetic agents have been employed, but a 1.5 per cent solution of metycaine has been preferred by most authors. Isotonic solution of sodium chloride is used as the solvent, and the amount of the solution required will depend on the desired concentration of the anesthetic agent and whether or not it is supplied in a concentrated solution or in a solid form. The accompanying table shows the method of diluting the contents of a 5 cc. ampule of a 20 per cent solution of metycaine in order to prepare weaker solutions of this drug.

6. Edwards, W. B., and Hingson, R. A.: Continuous Caudal Anesthesia in Obstetrics, Am. J. Surg. **57**: 459-464 (Sept.) 1942.

7. Lemmon, W. T.: A Method for Continuous Spinal Anesthesia, Ann. Surg. **111**: 141-144 (Jan.) 1940. Lemmon, W. T., and Paschal, G. W., Jr.: Continuous Spinal Anesthesia with Observations on the First Five Hundred Cases, Pennsylvania M. J. **44**: 975-981 (May) 1941.

8. Irving, Francis: Personal communication to the authors.

9. Manalan, S. A.: Caudal Block Anesthesia in Obstetrics, J.Indiana M. A. **35**: 564-565 (Oct.) 1942; Personal communication to the authors.

10. Tuohy, E. B.: Personal communication to the authors.

THE METHOD OF HINGSON AND EDWARDS

The special apparatus devised by Hingson and Edwards, which has been described, is depicted in figure 1. The needle was specially designed for this technic. It is made of stainless steel; it is semiflexible and malleable; it is of 19 gage and is 3½ inches long.

Preparation of Different Solutions of Metycaine by Adding Isotonic Solution of Sodium Chloride to the Contents of a 5 Cc. Ampule of a 20 per Cent Solution of the Drug

Strength of Final Solution, per Cent	Isotonic Solution of Sodium Chloride, q. s. ad:
0.5	200 cc.
1.0	100 cc.
1.3	75 cc.
1.5	66.6 cc.
2.0	50 cc.

The needle is inserted while the patient is in the knee-elbow or the lateral flexed position. It is inserted into the caudal canal a distance of 1 to 2 inches.

In the series of cases reported by Hingson and Edwards [11] the average duration of anesthesia was six and a half hours and the average total dose of metycaine was 2.6 Gm. According to these authors there was no alarming fall in blood pressure or any toxic reaction, and the babies were born in vigorous condition. Nausea occasionally occurs, but even patients who are nauseated may take fluids and food during the course of labor. In most instances this method produces complete relief of pain during both delivery and labor and is satisfactory for such operative procedures as episiotomy and perineal repair.

AN ALTERNATIVE METHOD

An alternative method of continuous caudal anesthesia entails the use of a ureteral catheter. This method was first employed in June 1942 and was evolved in order to eliminate the danger of breakage of needles and the possibility of trauma during labor. It is applicable for both obstetric and surgical procedures. In addition it was felt that the use of flexible equipment might permit greater freedom of movement on the part of the patient, particularly during the course of a long labor.

Preliminary Medication.—Premedication with a barbiturate such as pentobarbital sodium is employed particularly to guard against untoward effects of the local anesthetic. This drug is administered orally in comparatively small doses, that is, 1½ to 3 grains (0.1 to 0.2 Gm.). It may or may not help to relieve the preliminary pains of labor.

Equipment and Solutions.—The same equipment and solutions may be used for obstetric or surgical procedures.

Equipment: A sterile "continuous caudal tray" (fig. 3) should be prepared. This tray should contain:

One number 5 ureteral catheter.
One 13 gage Love-Barker intraspinal needle with stilet.
One 20 cc. Luer-Lok syringe or a 10 cc. Lundy syringe with Lundy-Luer adapter.
One Lundy 50 mm. needle.
One Lundy wheal needle.
One Luer wheal needle.
One 18 or 20 gage Luer intravenous needle 1½ inches long.
One 22 gage Luer hypodermic needle.
One Luer needle plug.
One Luer adapter.
One 200 cc. graduated cup.

Solutions: The following ampules of solution are sterilized and placed on the "continuous caudal tray":

Two 5 cc. ampules of a 20 per cent solution of metycaine.
Two 1 cc. ampules of 1:2,600 solution of epinephrine.
Isotonic solution of sodium chloride.

We have also used a 1.5 per cent solution of procaine hydrochloride, but we prefer a 1.5 per cent solution of metycaine because the duration of the resulting anesthesia is greater than the duration of anesthesia produced with procaine hydrochloride. Unless the patient's blood pressure is abnormally high, 1 cc. of a 1:2,600 solution of epinephrine is added to 66.6 cc. of the 1.5 per cent solution of metycaine. This increases the duration of anesthesia and permits the use of smaller total doses of metycaine.

Administration.—The following description of the administration of an anesthetic to produce continuous

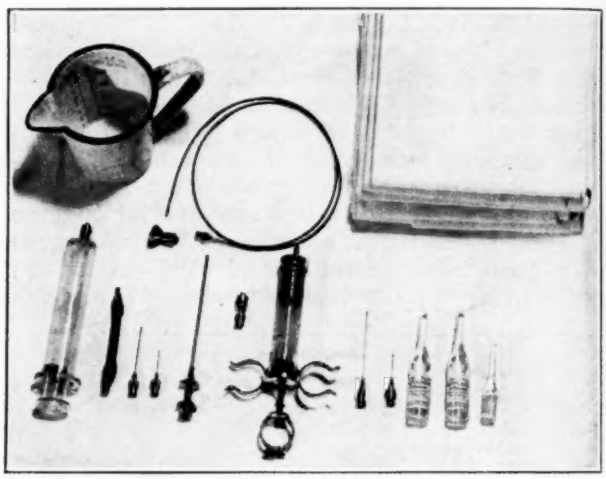

Fig. 3.—Sterile continuous caudal tray. The Lundy syringe, needles and Lundy-Luer adapter may be omitted from this tray and only the Luer syringe and needles may be used for the preliminary infiltration, but the use of the Lundy-Luer syringe facilitates the accomplishment of the first part of the injection.

caudal anesthesia will pertain chiefly to the use of this method of anesthesia in obstetric practice:

For primiparas the administration of the anesthetic solution is begun when the diameter of the dilating cervix has reached 2 to 3 cm. and when the labor pains have become severe. For multiparas and when labor is advancing rapidly the solution is injected somewhat earlier. For these patients the injection may be administered while they are on the delivery table, but when labor is more protracted the solution may be injected in the patient's room or in the predelivery room. The type of anesthesia and its effects should be explained to the patient before the administration of the anesthetic agent is begun.

The patient is placed in the knee-chest position or in the modified Sims position. When the modified Sims position is used, most physicians place the patient on her left side; however, Mousel [12] has expressed the opinion that the insertion of the needle and catheter can be facilitated by placing the patient on her right side. The anesthetist should face the patient. The patient is

11. Hingson, R. A., and Edwards, W. B.: Continuous Caudal Anesthesia During Labor and Delivery, Anesth. & Analg. **21**: 301-311 (Nov.-Dec.) 1942.

12. Mousel, L. H.: Personal communication to the authors.

moved close to the edge of the bed or delivery table. When this method of anesthesia is used for surgical operations the patient is placed in the prone position and her hips are elevated with pillows or a sacral rest.

The sacral region is sterilized widely about the proposed site of injection and the patient is draped. A skin

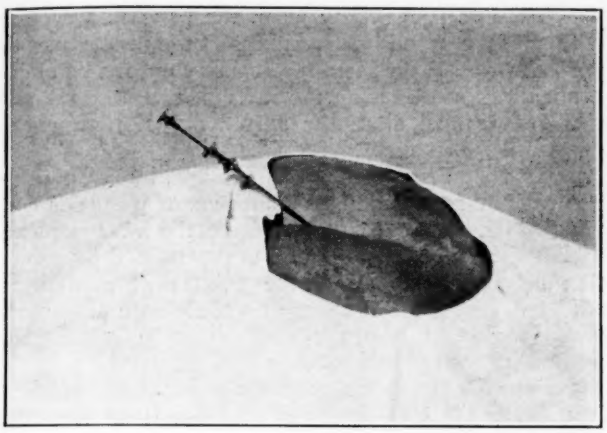

Fig. 4.—The 13 gage needle has been inserted into the caudal canal up to the level of the third sacral foramen. The stilet has been partially withdrawn.

wheal is raised over the middle portion of the sacral hiatus. A 20 gage intravenous needle 1½ inches long is attached to the syringe containing the anesthetic solution and is inserted through the skin wheal and through the sacrococcygeal ligament at an angle of 45 degrees. After the needle has pierced the sacrococcygeal ligament and has come to rest lightly on the anterior wall of the sacrum, 5 cc. of the solution of metycaine is injected. Even this preliminary injection into the lower part of the caudal canal sometimes will produce partial analgesia.

This needle is withdrawn and a 13 gage Love-Barker needle,[12a] with its stilet in place and with the bevel directed upward, is inserted at an angle of about 45

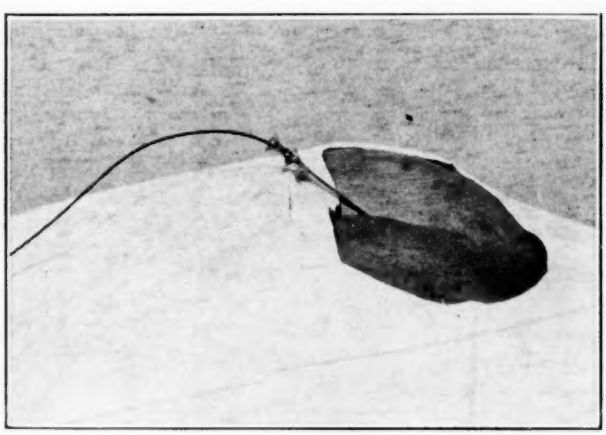

Fig. 5.—The stilet has been withdrawn from the 13 gage needle and the catheter has been introduced through it into the caudal canal.

degrees (fig. 4) and introduced through the sacrococcygeal ligament. When this needle touches the anterior wall of the sacral canal its bevel is turned downward and its hub depressed, after which it may be cautiously advanced upward along the midline of the caudal canal. The needle should be introduced slowly and cautiously, and it is desirable that the bevel of the needle does not scrape the bone of either the anterior or the posterior wall of the canal, since this can result in trauma to the venous plexus lining the canal. The point of the needle is advanced to about the level of the third sacral foramen but never as high as the level of the second foramen. In many instances it is necessary to insert the needle only 1 to 1½ inches into the caudal canal.

After the needle has been inserted to the correct position, the stilet is removed and a number 5 ureteral catheter (woven silk or, preferably, nylon) is passed through the needle and into the caudal canal. It is advanced so that, as determined by previous measurement, its tip will rest at about the level of the third sacral foramen or between the second or third foramen (fig. 5). If the ureteral catheter is of the graduated type, its position at the proper level of the caudal canal may be determined more accurately.

The catheter is then grasped distal to the needle to maintain it in the proper position while the 13 gage needle is withdrawn over it by combined pull and rotation. The catheter is left in place in the caudal

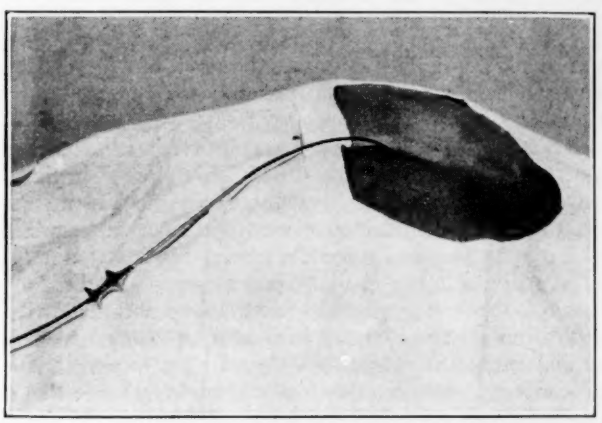

Fig. 6.—After the catheter has been inserted to the proper level in the caudal canal, the 13 gage needle is withdrawn over the catheter.

canal (fig. 6). The patency of the catheter should be checked before it is inserted. After the 13 gage needle has been withdrawn, 5 cc. of the local anesthetic solution is injected through the catheter into the caudal canal to check the patency of the lumen of the catheter and also to test for any possible untoward reaction to a small dose before larger doses are injected (fig. 7).

It is important during these maneuvers that the external end of the catheter be kept sterile. When the catheter is in place in the caudal canal a 22 gage Luer hypodermic needle the bevel of which has been cut off square is inserted into the catheter end and is held there with a small piece of adhesive tape. A sterile Luer cap is then applied to the hub of this needle; this will block any backflow of solution and will keep the end of the needle sterile.

Before the adhesive tape is applied, the skin about the site of the catheter is painted with a solution of mastic of benzene and a small sterile piece of sponge rubber or rubber dam is slipped over the catheter and is pressed firmly against the skin, which has been painted with the adhesive preparation. This forms a tight seal around the catheter and its point of exit and helps to prevent soiling and contamination by any secretions.

12a. Love, J. G.: Continuous Subarachnoid Drainage for Meningitis by Means of a Ureteral Catheter, J. A. M. A. **104:** 1595-1597 (May 4) 1935.

Several pieces of waterproof adhesive strapping are applied to the catheter at its exit from the skin, both to hold it in position and to form a seal around the exit of the catheter to prevent contamination from vaginal or rectal soiling. The remaining portion of the catheter is curved laterally and strapped to the skin of

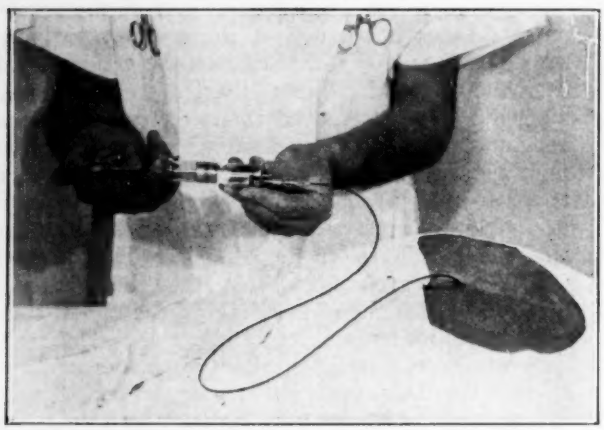

Fig. 7.—Preliminary injection of 1.5 per cent solution of metycaine through the catheter into the caudal canal prior to the fixation of the catheter with adhesive tape.

the flank by adhesive tape, the end of the catheter being left in an accessible position for repeated injections (fig. 8).

Thirty cc. of the anesthetic solution is injected very slowly, about 10 cc. at a time. This slow injection is important, since a large volume of solution injected rapidly at one time may cause pain, nausea, headache and other untoward effects which result from excessive pressure within the caudal canal or from rapid absorption of the anesthetic agent. Such reactions are an indication that the anesthetic solution has entered the caudal canal. If the anesthetic solution is warm when it is injected, its effectiveness will be increased; that is, the period of induction will be shortened and the degree of anesthesia will be increased.

After the injection has been made, the patient may be turned on her back and during the course of her labor she may lie in any position in which she is comfortable. She may change her position at any time without assistance, provided the catheter has been securely fixed at its point of exit from the skin. There is little danger of dislodging it and there is no danger from trauma.

Additional injections of 10 cc., but not more than 20 cc., of the solution of metycaine are administered at the first signs of reappearance of the labor pains. Once the catheter has been inserted and anesthesia obtained, the subsequent anesthesia parallels that obtained by the needle technic. The catheter is removed after the delivery or other operative procedures have been completed and before the patient is returned to her room. The site of puncture is painted with an anesthetic solution, and a small sterile dressing is applied.

POSSIBLE COMPLICATIONS AND PRECAUTIONS

Those Associated with the Needle Technic.—The possible complications to caudal block [13] in general have been frequently emphasized, and these apply equally to continuous caudal anesthesia. Most of the dangers and untoward effects occur at the time of the injection. Variations in the bony formation of the sacrum, obese patients in whom the bony landmarks are difficult to palpate, previous injuries and deformities in the sacral region, and faulty position of the patient at the time of injection serve to increase the difficulties and the possibility of untoward effects or inadequate anesthesia.

Faulty Position of the Needle: A common error, which occurs particularly when the patients are obese, is to miss the sacral hiatus and insert the needle over the posterior wall of the sacrum. It thus comes to lie underneath the skin overlying the sacrum, and no anesthesia will be obtained since the anesthetic solution will be deposited subcutaneously.

Intravenous Injection: It is possible, by scraping the point of the needle along the anterior or posterior bony wall of the caudal canal, to pierce the venous plexus within the canal. Unless this is determined by aspiration before injection and the point of the needle is adjusted, it is possible to inject a toxic dose of the local anesthetic agent into the venous system. This will produce untoward and perhaps fatal reactions.

Subarachnoid Injection: If the point of the needle is kept below the level of the second sacral foramen it is not likely that the needle will pierce the subarachnoid space. It is advisable to insert the needle to a point well below this level. Frequent aspirations should be carried out to see if spinal fluid can be withdrawn, before any local anesthetic solution is injected. Severe collapse and possibly death can occur if an overdose of a local anesthetic agent is administered intraspinally in this manner.

Broken Needles: Breaking of a needle has occurred more frequently during the early phase of the development of the method than it has in recent months. Hingson and Edwards have experienced little difficulty since the development of their new needle, which is supported at the hub. They did, however, instruct their patients to maintain a lateral position during the course of the anesthesia and to turn in bed with caution in order to prevent undue pressure on the needle. We feel that this

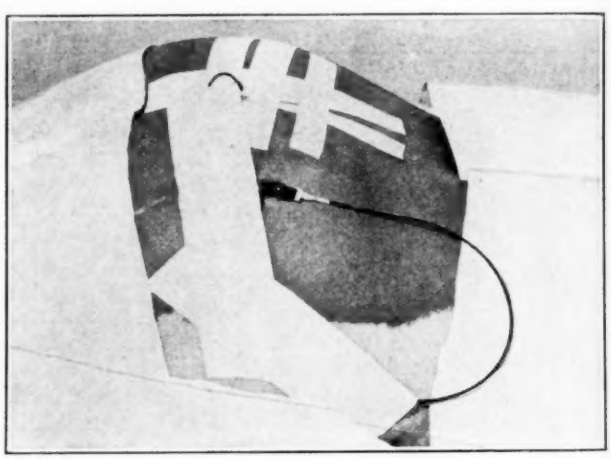

Fig. 8.—The exit of the catheter from the skin is thoroughly fixed with waterproof adhesive tape both to hold it in place and to prevent contamination of the point of exit by soiling. The catheter is carried across laterally and fixed to the skin over part of its length by adhesive stripping. A 20 gage Luer needle has been inserted into the distal end of the catheter and fixed in place by a small piece of adhesive tape. Between injections the hub of this needle is protected and kept sterile by a Luer cap. The end of the catheter is carried around to the flank so that it rests in accessible position for repeated injections.

is a wise precaution when any type of needle is employed in this technic for the following reasons:

1. Since the point of the needle may impinge on bone within the caudal canal, any pressure on the hub of the

13. Adams, R. C., and Tuohy, E. B.: Sacral Block Anesthesia: A Consideration of the Unusual Difficulties Encountered and a Report of Two Unusual Cases, Minnesota Med. **21**: 397-402 (June) 1938.

needle will predispose to bending of the needle or to trauma inside the canal, if not in actual breakage of the needle.

2. If, by the patient's movements, the hub of the needle is made to move from side to side, it seems reasonable that the sacrococcygeal ligament will act as a fulcrum and that a corresponding movement will be set up in that portion of the needle within the caudal canal. It will appear that under certain circumstances this could produce trauma to the nerves and vessels.

3. Breakage of a needle in the caudal canal may necessitate incision for removal and in some cases has necessitated laminectomy. These are serious procedures in an obstetric case and demonstrate the necessity of both technical skill and careful institutional supervision. One of the chief methods of prophylaxis against breakage of needles during continuous caudal anesthesia is the use of one needle in only 4 or 5 cases. Should there be any doubt as to the needle being defective or weak, another needle should be substituted. If breakage of a needle within the caudal canal should occur, it should be removed with the least possible delay in order to prevent the increasing danger of irritation and infection. It is wise to remove it within twenty-four hours.

Unilateral Anesthesia: This has occurred in a few cases, presumably owing to lateral deviation of the point of the needle. This can usually be corrected by adjustment of the needle so that the anesthetic solution reaches the nerve trunks of the unanesthetized side.

Those Associated with the Catheter Technic.—Although the use of the catheter obviates the danger of breakage of the needle and of trauma, other possible complications peculiar to its use must be borne in mind.

Trauma: The 13 gage needle through which the catheter is introduced is large and can produce trauma if two or more attempts are made to insert it. If only one insertion is necessary, the trauma can be kept minimal as the needle need not be inserted into the caudal canal for a distance of more than 1 or 2 inches and it remains in the canal only for a matter of seconds or minutes.

If more than one puncture is required, trauma may occur. This will increase the possibility of irritation and infection. If a second puncture in a different location has been made, leakage of the local anesthetic solution through the original site of puncture has occurred. This lessens the chances of complete anesthesia and increases the possibility of infection. On this basis we do not feel that multiple punctures should be made if the first one is unsuccessful.

Care of Catheters: Catheters should be carefully examined for defects before use and old or cracked ones discarded. Catheters are sterilized by boiling in an antiseptic solution. When not being used, they are stored in a container which prevents kinking or buckling.

Intradural Injection: Although the danger of puncturing the dura with the catheter is remote, incomplete anesthesia may result from inserting the catheter too high in the caudal canal. This causes the solution to be deposited at too high a level and thus it may not get in contact with all the sacral nerves. However, even if the danger of inserting the tip of the catheter through the dura is remote, there is nothing to prevent the catheter entering the dura when the 13 gage needle is inserted to too high a level in the caudal canal. It is both unnecessary and unsafe to insert this needle higher than the level of the third sacral foramen.

Curling of the Catheter: The catheter may become curled within the caudal canal and its tip may thus be deflected to one side or the other or backward toward the hiatus. This also may result in incorrect distribution of the anesthetic solution and lead to incomplete or unilateral anesthesia.

Tearing the Catheter: If the catheter has been advanced too far into the caudal canal and it becomes necessary to withdraw it to the proper level, the 13 gage needle should be withdrawn as well and both the needle and the catheter reinserted. If an attempt is made to withdraw the catheter without withdrawing the needle, the catheter may become caught on the sharp bevel of the needle. Traction on the catheter under such circumstances may result in shearing off its tip in the caudal canal.

Manipulation of the Catheter: The catheter may be so slender that it may be difficult to manipulate properly.

MISCELLANEOUS EFFECTS COMMON TO THE TWO METHODS

Very rapid injection of the anesthetic solution or the injection of a large amount of solution at any one time may produce headache, dizziness, a feeling of pressure in the legs or over the sacrum and momentary syncopal-like effects. Some patients experience bachache of varying duration during the postpartum period. This might be attributed to the anesthetic in some cases. In some cases the blood pressure drops during the period of anesthesia, but this reaction seldom has been acute or alarming. Gready and Hesseltine [14] reported a case in which the method was employed for an anticipated abdominal cesarean section in a case of toxemia and hypertension. The systolic blood pressure, which had been 190 mm. of mercury, fell to an indeterminate level. The patient recovered after the administration of oxygen by inhalation and of ephedrine hypodermically, but no operation was performed at the time.

Certain contraindications have been noted. Such conditions as placenta previa, inertia uteri, hysterical or psychotic states and disproportion between size of the child and pelvis are definite contraindications to the use of the method. It therefore is obvious that the nature of the case should be thoroughly understood before the choice of the anesthetic is made. Gready and Hesseltine said that the method is contraindicated for difficult rotation and versions, since complete uterine relaxation is desirable for these procedures. Other contraindications include a history of hypersensitivity to local anesthetic agents, infective processes over the sacrum and sacral hiatus, and congenital or traumatic malpositions of the vertebral column, especially of the sacral segment.

Hingson and Edwards [15] expressed the opinion that a solution of epinephrine should be withheld from the local anesthetic solution as it might predispose to uterine inertia. It is our feeling that this possible undesirable effect may be overweighed by the increased duration of anesthetic effect produced by its use in suitable cases. We have not found the use of epinephrine to be disadvantageous; it is omitted, however, from the local anesthetic solution if the patient has any type of hypertension or if there is a history of idiosyncrasy to the drug. There is possibly less fall in blood pressure as a result of the caudal anesthesia in cases in which epinephrine is employed. If there is no contraindication to the use

14. Gready, T. G., Jr., and Hesseltine, H. C.: Continuous Caudal Anesthesia in Obstetrics, J. A. M. A. **121:** 229-230 (Jan. 23) 1943.
15. Hingson, R. A., and Edwards, W. B.: Continuous Caudal Analgesia in Obstetrics, J. A. M. A. **121:** 225-229 (Jan. 23) 1943.

of epinephrine we employ it in the following amounts: One cc. of a 1:2,600 solution or 6 minims (0.4 cc.) of a 1:1,000 solution is added to 66.6 cc. of a 1.5 per cent solution of metycaine. If total doses larger than 66.6 cc. of the 1.5 per cent solution of metycaine are required the epinephrine may be omitted from the subsequent doses, particularly if the patient's blood pressure becomes elevated above normal.

One advantageous feature of this method of anesthesia is that if complete anesthesia is not obtained there does not appear to be any contraindication to the supplementary use of suitable anesthetic agents by inhalation.

If the cardiovascular system is normal or nearly normal, injection may be administered while the patient is in the knee-chest or the modified Sims position, but if a cardiovascular lesion such as severe cardiac decompensation is present the knee-chest or the knee-elbow position should not be used. If orthopnea is present, the patient cannot be placed in this position with safety and the modified Sims position will be indicated.

COMMENT

We have used both of these methods of continuous caudal anesthesia. Our results will be published subsequently, in addition to the results obtained in a series of cases in which operations were performed on the anus and lower part of the rectum, perineum, vagina, uterus, urogenital tract and adjacent parts. The method is still comparatively new and there is much to learn concerning further details and safeguards related to its technic.

We are of the opinion that for the present, at least, its use should be confined to institutional practice and in obstetric clinics where its administration will be accomplished and supervised by physicians experienced in the various technics of caudal anesthesia and its possible indications and contraindications. This precautionary attitude concerning the use of the method generally has been stressed by Hingson and Edwards and others. A recent editorial[16] in THE JOURNAL contained the following statement: "The technic is one which demands the competent art of the specially trained anesthetist or surgeon and the practice of a high order of obstetric science. It is not a method for indiscriminate use in the home or by those who have not been especially trained in its technic or in a realization of conditions which might contraindicate its use."

The method, in general, is undoubtedly a decided step forward in obstetric anesthesia and analgesia. The pioneer work of Hingson and Edwards has laid the foundation for those who will use the method in future years, and these investigators are to be complimented on their well controlled experimental and clinical researches. Except for earlier difficulties associated with technical phases of the injection, which have been noted by all who have employed the method, it would appear to produce satisfactory results for both the mother and the baby.

SUMMARY

Two methods of continuous caudal anesthesia appear to have certain advantages and certain drawbacks. Certain technical difficulties associated with the early clinical trial of both methods are being avoided by improved equipment and increased experience in the application of the methods. There are certain dangers and precautions which apply to both single dose and continuous caudal anesthesia. Both methods have certain advantages and disadvantages. The disadvantages include complications due to breakage of needles, intravenous injection, trauma, subdural injection and infection. Certain suggestions have been made concerning the technic of both methods in order to obviate these untoward occurrences. Fundamentally, the method produces excellent anesthesia and analgesia for both labor and delivery and should carry a wide margin of safety for mother and child. Careful anesthetic records of the technic and course of anesthesia should be kept. Since most of the dangers, drawbacks and untoward effects have been associated with certain technical difficulties which could not be foreseen in the early phases of the work by even experienced physicians, it is suggested that for the present, at least, the use of the method be confined to institutional practice by persons trained and experienced in caudal anesthesia.

16. Continuous Caudal Analgesia in Obstetrics: A Method for Safe, Painless Childbirth, editorial, J. A. M. A. **121**: 260-261 (Jan. 23) 1943.

AN OUTBREAK OF HALOWAX ACNE ("CABLE RASH") AMONG ELECTRICIANS

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The first observations on the development of acnelike lesions among workers in the United States coming in contact with chlornaphthalenes and chlordiphenyls as well as acute yellow atrophy of the liver occurring among such workers were reported[1] in 1935. Since that time many authors have reported similar observations.

Despite the fact that these compounds, if used without proper safety precautions, cause a high incidence of skin conditions and, in certain processes such as coating wires, also entail the serious hazard of acute yellow atrophy of the liver, they are still being used as dielectrics and insulators, because they are waterproof and have excellent heat resisting and flame proof properties.

Since our entrance into the war, the speed-up in our shipyards has in many instances resulted in failure to install the proper safety precautions necessary when handling wires insulated with these substances.

Reports have been received by the U. S. Public Health Service from several shipyards of acnelike lesions occurring among electricians installing heat and flame proof cables in ships. Investigations have always shown that the cables causing the trouble were coated with chlornaphthalenes and chlordiphenyls (halowax). The most recent investigation was made in response to a request from the health officer of one of our Western states for an investigation of an outbreak of dermatitis among electricians working in the shipyards of that state. The electricians had become alarmed because some among them had developed acnelike lesions; they had read in the newspapers of three workers who had died of acute yellow atrophy of the liver at the plant where the wires with which they worked were made. It was only with great difficulty that these electricians were persuaded to remain at their work until the arrival of the representative of the U. S. Public Health Service to make an investigation.

Immediately on his arrival, a conference was arranged to bring together representatives of the workers' unions,

From the Dermatoses Investigations Section, Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service.

1. Schwartz, Louis: Dermatitis from Synthetic Resins and Waxes, J. Pub. Health **26**: 586 (June) 1936.

representatives of the state health department and superintendents of the shipyards. At the meeting it was decided to visit all shipyards where the so-called "cable rash" was reported and to examine the workers suspected of having "cable rash" in order to ascertain whether all the cases of dermatitis were caused by handling cables.

In the first shipyard visited it was found that dermatitis was limited to cable "strippers." The work was performed in the intercommunication room of the ship. In plant A, 8 persons were presented for examination as suffering with "cable rash." Seven of these were found to have halowax acne. In plant B, 22 cases, all halowax acne, were presented; all of these occurred in electricians engaged in "stripping" cable. In this shipyard, electricians affected worked for several months on "stripping" cable in the intercommunication room. They stated that about two months had elapsed before they noticed signs of the acne on the face. Those who had worked longest were most severely affected. None of the workers showed signs of systemic poisoning. Samples of the wire which the workers "stripped" were examined. It was noted that one of the cables made by the company where deaths had been reported contained considerable amounts of halowax impregnated into asbestos and wrapped around the wire as insulation. The halowax was loosely contained in the asbestos and flaked off easily as the wires were being "stripped."

In the second shipyard visited it was found that the "strippers" worked only part time at "stripping" and at other electrical work the rest of the day. It was also found that the type of cable described was not being used. There was being used, however, another type of cable made by the same company from which the halowax did not flake off so readily. Twenty-one electricians who had been engaged at various times in "stripping" were presented for examination. While various skin conditions were noted, such as insect bites, impetigo and pruritis hiemalis, there were no cases of halowax acne.

In the third shipyard visited it was again found that cable being "stripped" was not the type from which the halowax flaked easily and the electricians worked only part time at "stripping." Nineteen cases of so-called cable rash were presented for examination but none of them proved to be halowax acne. They were the various skin diseases such as those found among workers in the second shipyard inspected.

In the fourth shipyard the operation performed by the electricians was the same as observed in the other yards. Among 12 cases of so-called cable rash presented for examination there were no cases of halowax acne.

Samples of cables from all four yards were compared. It was found that the cable most used at the first shipyard and to which the workers attributed the "cable rash" was so coated with halowax that in the "stripping" operation the halowax flaked off easily and scattered on the hands and clothes of the "strippers." Moreover, at this shipyard more halowax coated cable made by the company where the deaths had been reported was used than at any of the other yards. Workers at this shipyard had been engaged in "stripping" for a longer time than in the other shipyards and "stripped" all day instead of only part of the day as in the other shipyards. Cables made by other companies were found to have halowax insulation, but the halowax was more tightly held against the wire and more firmly impregnated into the asbestos so that it did not flake easily.

From this investigation it seemed evident that the constant handling of cable in which halowax is loosely packed and flakes off is responsible for the acne occurring among the "strippers" in the first shipyard inspected.

When this conclusion was reached, a meeting with the dermatologists of the city was held and cases of halowax acne were presented. This was done with the purpose of acquainting physicians with the disease and outlining for them approved methods of treatment.

The diagnosis of halowax acne was determined by (1) the history of industrial exposure to halowax, (2) the appearance of the lesions and (3) their location. The history will show that the worker was engaged in an occupation in which he came in contact with halowax or its fumes for a period of a month or more before the lesions began to appear. In this case the occupation was "stripper" of wires on heat and flame proof cables insulated with halowax. Lesions are pinhead to pea size pale straw colored cysts formed by plugging of the orifices of the sebaceous glands, resulting in retention of the secretion and in the keratinization of the lining membrane. Cysts are located on the face, lobes of the ears, retroaural folds, back of the neck, shoulders, abdomen around the navel, thighs and wherever the halowax soiled clothes may touch the skin. It is not unusual to see similar lesions in the wife and children of the worker caused by contact with the soiled work clothes, if they are worn or washed at home.

Fig. 1.—Halowax acne on an electrician: note cysts behind ears and on ear cartilages.

Once seen, halowax acne (fig. 1) cannot be mistaken for anything else except perhaps coal tar pitch acne, from which it can be differentiated by the history of the occu-

pational exposure. Acnes caused by chlordiphenyl, chlornaphthalenes and chlordiphenyloxide are identical in appearance with halowax acne. It is possible for the uninitiated to confuse acne vulgaris with halowax acne, especially if the halowax acne occurs in a patient of acne age.

The differential points other than age and occupational exposure are given in table 1.

The microscopic examination of a typical halowax cyst (fig. 2) made by Surgeon Samuel M. Peck (R) is as follows:

The epidermis shows relatively little, except for some scaling without parakeratosis. We see the evident widening of the follicular openings and the formation of hyperkeratotic plugs. Here are seen horned cysts down in the cutis and, in the deeper portions of hair follicles, both in and around it, there is a

Fig. 2.—Biopsy section of chloracne from chlornaphthalenes and chlordiphenyls (reduced from photomicrograph originally published in Public Health Reports [2]).

marked inflammatory reaction. An almost tuberculoid granulation tissue is seen consisting of dense accumulations of both foreign body and Langerhans type of giant cells. Between these giant cells are many histiocytes and lymphocytes, the histiocytes in many instances having the characteristics of epithelioid cells. In the serial sections it can be seen that these horned cysts situated in the middle cutis are extensions of the enlarged hyperkeratotic follicles in which the whole follicular apparatus has been replaced by a huge invaginated structure full of horny material which has pressed against the rest of the structure causing atrophy with the resultant formation of horned cysts. Also from the serial sections it is evident that the dense mass of foreign body granulation tissue reaction is situated in and around remnants of sebaceous glands and hair bulbs.

Interpretation.—The process is analogous to acne in that we have plugging of the follicular openings, follicular and perifollicular inflammatory reactions and a foreign body giant reaction which is often associated in acne with the escape of sebaceous gland contents into the surrounding tissues. It differs from acne in that the plugging of the follicular openings is due almost exclusively to a hyperkeratotic process which seems to include not only the mouth of the hair follicles, but also extends downward, following the invagination into the

Table 1.—*Differential Points*

Halowax Acne	Acne Vulgaris
Usually occurs on face, behind ears, on neck, chest, abdomen	Usually occurs on face, back and chest
Comedones, while present, are not a prominent feature	Comedones are a predominant feature
Acnelike lesions are usually pale, straw colored, noninflammatory cysts	Lesions are inflammatory
Contents of cysts consist mostly of keratin plus sebaceous matter	Contents of lesions consist of sebaceous matter and inflammatory exudate
The skin may be dry.....	The skin is greasy
The lesions are persistent.....	Individual lesions are transient

associated structures. In acne we ordinarily have a combination of follicular hyperkeratosis and excessive secretion of the sebaceous glands. The last seems to play a very little role in this process. There is no real comedo present, but more like the follicular hyperkeratosis seen in ordinary vitamin A deficiencies.[2]

Of most importance in the treatment of these cases is the treatment of the skin with tincture of green soap or a synthetic wetting agent. The synthetic wetting agent is to be preferred and should consist of 10 per cent aqueous solution of either Igepon, Duponol, Santomerse, Naccanol or Aerosol. It is not advisable to add a sulfonated fatty oil to the wetting agent because the sulfonated fatty oils decrease, if anything, the defatting powers of such a solution of wetting agent as is given.

Comedones should be expressed and cysts evacuated two or three times each week. The comedones may be expressed by the nurse in the plant, but a physician should perform all operations which require incision of the skin in order to evacuate cysts. A mild peeling solution such as lotio alba is advised for use at night. If x-rays are used, they should be administered with great

Table 2.—*Tetryl Protective Cream*

	Per Cent
Shellac	12.96
Isopropyl alcohol	30.82
Bodied linseed oil	3.70
Stearic acid	0.62
Flexol	0.62
Carbitol	3.08
Talcum powder	20.18
Ferric oxide	0.15
Titanium dioxide	9.88
Sodium bicarbonate	3.08
Sodium perborate	14.91

caution especially if the patient is beyond the acne age, as in these patients the skin is usually dry and further depression of the function of the sebaceous glands is not desirable.

At the final meeting of the representatives of the health department, the workers and superintendents of the shipyards the following recommendations were made:

2. Schwartz, Louis, and Barlow, Frank A.: Chloracne from Cutting Oils, Pub. Health Rep. **57**: 1747-1752 (Nov. 20) 1942.

Since no cases of halowax acne were found in three of the yards, there need not be any special precautions taken by the electricians in these yards as long as they handle the same kind of cables as they have been handling and as long as they do not spend most of their time in "stripping"; however, if at any time they must handle the special cable with the loose halowax insulation, they should also take these precautions:

1. It is recommended that workers engaged in "stripping" cable containing either chlornaphthalene, chlordiphenyl or chlordiphenyloxide be supplied with hood respirators. It is preferable to have these hood respirators made from a transparent synthetic resin such as pliofilm or vinylite or perhaps a fireproof cellophane. The eye piece should be a large flat plate of lucite rather than the conventional double lenses. The respirator should be closely fitted to the nose and contain such filters as will efficiently filter out dust and wax.

2. The "strippers" should be supplied with clean coveralls daily, the coveralls to be laundered at the shipyard.

3. "Strippers" should wear long underclothes cleaned daily at the shipyard.

4. "Strippers" should be required to take a shower bath before going home and they should be furnished with toilet soap for this purpose.

If, for any reason, the hood respirator advocated cannot be obtained or used, a substitute not quite as good will be found in protective ointments for the face, neck and ears. The ointments should be of the type that coat the skin with a dry film that prevents the halowax from touching the skin and also prevents the soiled fingers from getting in contact with the skin. It is believed that the tetryl protective cream developed by the U. S. Public Health Service would answer this purpose. The formula for this cream is given in table 2. This preparation is now being manufactured.

The tetryl protective cream consists essentially of an alcoholic solution of shellac mixed with sodium perborate and zinc oxide. When it is applied to the skin the alcohol evaporates in about ten minutes and leaves a dry adherent coating on the skin which is difficult to remove unless it is washed off with soap and water. A somewhat similar preparation consists essentially of an aqueous solution of casein and zinc oxide and is also being manufactured.

If these ointments are used they should be applied before going to work, washed off before going to lunch, reapplied after lunch, and again washed off before going home. The clean coveralls and clean underclothes should be compulsory even if the ointment and hood are used.

It is also recommended that those workers who have halowax acne be given precautionary liver function tests, not because it is thought that they have liver damage but rather in order to make certain they have not. Liver damage does not ordinarily occur in workers handling the dry chlorinated hydrocarbon waxes. It has been found usually to occur among workers handling the molten waxes or the waxes in solution. In such instances the fumes are inhaled.

Safety directors of the shipyards were advised to report to the industrial hygiene division of the state board of health any cases of acne occurring among electricians in order that investigations may be made in time to prevent further outbreaks.

THE IDENTIFICATION AND MEASUREMENT OF THE PSYCHONEUROSES IN MEDICAL PRACTICE

THE MINNESOTA MULTIPHASIC PERSONALITY INVENTORY

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Many a medical man has wished for an easily applicable measuring device which would identify and characterize the psychoneurotic patient with a minimum use of the time consuming interview technic that is conventional in the psychiatric approach. One may not desire to deal with the psychoneuroses in one's practice, but the physician or surgeon is indeed insensitive to the problem or very young in the profession who has not been plagued by his inability appropriately to assess the role of the neurotic element in some of his patients.

Without wishing to belabor the topic of the neuroses unnecessarily, because much has been published on it, we should like to remind the reader of a few general points that are pertinent to this report. Competent internists have estimated variously that from 30 to 70 per cent of the ambulatory patients who appear for medical attention come primarily because of one or more complaints that turn out to be psychoneurotic in nature. It is not implicit in this statement that no concomitant organic disease is ever discovered on examination, but more frequently than otherwise the complaint is not directly ascribable to such positive manifestations as the physician may elicit. In other words, a considerable proportion of medical patients are beset by and wish for relief from emotional states rather than from bodily disease of seriously crippling importance. Furthermore, many patients with more or less severe organic disease are simultaneously suffering from undesirable emotional reactions which may definitely impede improvement or produce a worsening of the organic condition; often these patients are as much influenced for the better by reassurance, suggestion and encouragement as by those measures directed at the organic state.

In surgical practice the percentage of severely psychoneurotic patients is probably somewhat smaller. Of course, psychoneurotic patients may have surgical conditions requiring operation. Aside from emergencies, however, most experienced surgeons have learned by one or more bitter lessons that in the presence of certain types of neurosis it is indeed wise to proceed with caution and to operate only after giving appropriate attention to the attitudes and morale of the patient and his family.

Recognizing this problem and desiring to contribute to its solution, we began work in 1937 on the development of an objective personality test which is simple to use, easy to interpret and conserving of time. We have chosen to name this test the Minnesota Multiphasic Personality Inventory. The statistical technics involved

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in this study have been reported by us elsewhere;[1] the details will not be repeated at this time but only a general description of the makeup and mode of administration of the schedule and a discussion of some of its principal applications for the medical men are given in the present paper. Likewise, only those portions of the inventory which deal with hypochondriasis, hysteria and reactive depression will be discussed.

THE PSYCHOMETRIC INSTRUMENT

Initially the assumption was made that statements by patients given verbally to the physician were probably not much more reliable or valid than if the same meanings were conveyed to him by sorting them on cards into the categories of "True," "False" or "Cannot Say" accordingly as the patient thinks they apply to himself. Subsequent tests of this assumption proved its truth to a very satisfactory degree. In accord with this supposition, informational items with probable medical or psychiatric significance were collected; these were statements that a lay person would probably be capable of comprehending and reporting on. They were located by systematically culling them from several standard published directions for performing medical, neurologic and psychiatric examinations, from several published schedules for social and personal attitudes and from our own clinical experience. Five hundred and fifty items were retained, and they constitute the basis for the Minnesota Multiphasic Personality Inventory. Each was stated in simple language, usually in the first person singular, and was separately printed on a card. An example is the item "There seems to be a lump in my throat most of the time." The groupings into which these items may be classified are as follows:

1. General health (9 items).
2. General neurologic (19 items).
3. Cranial nerves (11 items).
4. Motility and coordination (6 items).
5. Sensibility (5 items).
6. Vasomotor, trophic, speech, secretory (10 items).
7. Cardiorespiratory (5 items).
8. Gastrointestinal (11 items).
9. Genitourinary (5 items).
10. Habits (19 items).
11. Family and marital (26 items).
12. Occupational (18 items).
13. Educational (12 items).
14. Sexual attitudes (16 items).
15. Religious attitudes (19 items).
16. Political attitudes—law and order (46 items).
17. Social attitudes (72 items).
18. Affect, depressive (32 items).
19. Affect, manic (24 items).
20. Obsessive, compulsive (15 items).
21. Delusions, hallucinations, illusions, ideas of reference (31 items).
22. Phobias (29 items).
23. Sadistic, masochistic (7 items).
24. Morale (33 items).
25. Items primarily related to masculinity-femininity (55 items).
26. Items to indicate whether the individual is trying to place himself in an improbably acceptable light (15 items).

In order to locate items which would characterize a given psychoneurotic or other psychiatric type of personality deviation, it was necessary first to discover their individual frequency of placement in the "True" or "False" category for a group of "normal" individuals. These normal individuals were visitors to patients in the University Hospital who stated that they were not under a physician's care and considered themselves to be in good health. The schedule was administered to about 700 such persons. They were reasonably representative of the occupational and social levels of the University Hospital patients. As an additional check we collected inventory records on groups of students entering college and on WPA workers numbering more than 200 each. To obtain data on the placement of items by clinical groups, the items are administered to all cooperative neuropsychiatric inpatients.

An approximate idea of the method by which the various personality scales were developed can be gained by a brief review of the development of the hypochondriasis scale. A group of 50 hypochondriacal patients falling into the diagnostic category with acceptable uniformity was carefully selected on the basis of the clinical observation. The location of an item having significance in differentiating hypochondriasis from normality is a simple statistical matter. If 5 per cent of normal persons declare, for instance, that they commonly suffer with discomfort in the pit of the stomach, whereas 80 per cent of the hypochondriacal group make the same declaration, then this is an item tending to characterize hypochondriasis. In itself the item might have several other possible significances, but 60 or 70 similarly differential items identify a pattern of responses which characterizes the hypochondriacal person. Such a group of experimentally discriminative items may be spoken of as a hypochondriacal scale, since the degree to which an individual may be similar to definite clinical hypochondriacs can be determined by merely counting the items which the person answers identically with the hypochondriacal group of patients.

Although the foregoing description of the development of the scale for hypochondriasis is oversimplified, it is by such procedures that the various scales have been developed from the personality inventory. To date we have well tested scales for hypochondriasis, depression and psychasthenia and tentative scales for hysteria, psychopathic trends of the amoral type, masculinity-femininity and paranoia; several other scales are merely awaiting the appearance of sufficient clinical material to permit the statistical work for their development. Corrections have been calculated for age and sex, and the scoring has been reduced to a standard such that arbitrarily 50 represents the average score for a group of normal persons; 10 points above or below 50 represent one standard deviation from this mean value and 20 points represent two standard deviations, and so on. By the use of the standard scale, the scores for the various characteristics become comparable with one another and can be entered together on a single profile chart. This is of great convenience in the interpretation of the findings in the individual case, since the limits beyond the normal range can be expressed by a single number. Thus any score above 70 but below 80 is between two and three standard deviations above the average score of a series of normal individuals and indicates a probable abnormality for the characteristic under consideration; a score of 80 is three standard deviations above the average normal score and indicates practically certain abnormality. Scores lower than the normal average appear up to the present time to have no particular significance.

In the actual administration of the inventory, the patient is given a box containing the five hundred and

1. Hathaway, S. R., and McKinley, J. C.: A Multiphasic Personality Schedule (Minnesota): I. Construction of the Schedule, J. Psychol. **10**: 249 (Oct.) 1940. McKinley, J. C., and Hathaway, S. R.: II. A Differential Study of Hypochondriasis, ibid. **10**: 255 (Oct.) 1940. Hathaway, S. R., and McKinley, J. C.: III. The Measurement of Symptomatic Depression, ibid. **14**: 73 (July) 1942.

fifty cards and the three guide cards marked "True," "False" and "Cannot Say." His attention is called to the directions in the cover of the filing box, which read as follows:

Take out the first card in the front of the box.
Read the statement on it and decide whether or not it is true as applied to you.
If it is true, or mostly true, put it in the back of the box directly behind the card that says "True."
If it is not usually or not at all true as applied to you, put it behind behind the card that says "False."
If the statement does not apply to you, or if it is something that you don't know about, put it behind the card that says "Cannot Say."
Do this with every card in the box.
There are no right or wrong answers.
Remember to give your own opinion of yourself.

The sorting time of the patient varies considerably, depending on his mental status. Normal, alert, intelligent persons will run through the cards in thirty to fifty minutes. Individuals with dull normal intellects will require up to an hour and a half. The moron group will need two hours or more but are usually capable of giving reliable responses. Depressed patients, especially if there is psychomotor retardation, may require several hours and several sittings for completion, and urging by an attendant may be necessary. Hypomanic patients usually give reliable responses. Patients with grossly psychotic syndromes are generally incapable of sorting the cards. However, these conditions are usually not such subtle problems from the diagnostic standpoint as are those borderline mental states in which the patient remains capable of reliable cooperation and in which the test is designed to be most useful. An accurate clerk can be readily taught to record and score the tests, and a trained clerk will spend only twenty or twenty-five minutes in producing the finished profile after the patient has sorted the cards.

It is intended in this report to present several type cases which illustrate some of the interpretations that seem permissible to us on the basis of the personality profiles as derived from the inventory; the clinical features of the cases are then discussed for comparison.

REPORT OF CASES

CASE 1.—A man aged 43 was admitted to the University of Minnesota Hospital on Sept. 23, 1940 for surgical attention because of a probable ulcer. In the course of the routine workup of the ulcer possibility certain psychoneurotic features impressed the cooperating internist sufficiently so that psychiatric appraisal of the case was requested.

Following a brief introductory psychiatric interview, the Minnesota Multiphasic Personality Inventory was administered on September 30, with the resultant scores hypochondriasis 87, depression 83, hysteria 78.

The scores on the other available scales were definitely at normal levels and are essentially noncontributory to this report. Thus it appeared from the inventory that the patient was severely hypochondriacal and depressed and that hysterical features also very likely were complicating the picture. The presence of these psychologic factors in the patient's illness was quickly confirmed, although on interview he tended to avoid the issues relative to his emotional reactions. The hypochondriasis came out in the following statements: The patient said he was greatly concerned about his health, especially in relation to his "duodenal ulcer," the malfunctioning of his intestine, his loss of weight and his inability to handle a full diet without great discomfort. In consequence, he stated that he was depressed over the ominous future which seemed inevitable, particularly in consideration of the lack of progress that he had made under a careful ulcer regimen during the previous several months. In discussing his symptoms he related his distress during attacks, which were rather obviously hysterical. These were especially frequent in the weeks just preceding admission. They began with a sense of gas in the stomach and of pressure on the heart and in the chest. Very soon tachycardia and palpitation and then shortness of breath would appear, and the patient would become panic stricken for fear of suffocation. He would call his wife, have her open all the windows in his room and help him to a window so that he could get air. More recently he had been so weak that he had to be content to have her support him sitting up in bed during these spells. He would calm down after fifteen to twenty minutes but felt exhausted afterward.

The history of the duodenal ulcer dated back about eighteen months, when he began having rather indefinite abdominal distress. Roentgenograms taken shortly after the onset demonstrated a small duodenal ulcer, and this was confirmed later in a second series of films taken at another clinic. At the same time it was determined that, in spite of a strict Sippy regimen with large quantities of alkali, he had a total gastric acidity up to 114 degrees and a hyperchlorhydria of 100 degrees.

The medical investigation at the University of Minnesota Hospital was essentially negative except for the following findings: The patient was considerably emaciated; he had some generalized abdominal tenderness. Gastric analysis during fasting revealed 97 cc. of contents with a total acidity of 107 degrees and a free hydrochloric acid titer of 102 degrees. Fractional anaylsis after histamine revealed a total acidity range from 67 to 103 degrees and free hydrochloric acid from 60 to 98 degrees. X-ray studies demonstrated decided hypermotility of the gastrointestinal tract. The duodenal shadows showed some irregularity suggesting duodenitis, but evidences of ulcer were lacking. Routine blood and urine examinations gave negative results. There was no blood in the feces. The blood urea nitrogen, carbon dioxide combining power, blood chlorides and plasma proteins were all within normal limits.

Although the surgeon in charge felt that duodenal ulcer had not been satisfactorily excluded as a possibility, it was agreed in view of the test results that a combined medical and psychiatric approach was worth a trial and that surgical intervention could be safely postponed for a few weeks. In consequence the patient was told that his diet would be rapidly expanded and that he would be carefully observed for danger signs if they should appear. The possibility of some discomfort was admitted and it was agreed that his reports on it would be given due weight, but he would be expected to eat what was placed before him. For the first twelve days of the hospital stay, previous to the new regimen, the patient's intake averaged only 1,120 calories daily. During the next six days, with daily reassurance and urging, this was increased to an average of 1,310 calories. At the end of this time his food was changed to a general bland diet of three meals a day with a caloric intake varying from 1,790 to 5,800 and averaging 3,380 daily for the remaining twelve days of the hospital stay. The patient's pulse was at first extremely variable, ranging from 76 to 140, and his temperature spiked occasionally, once going to 102 F. After the new regimen was instituted the temperature remained normal and the pulse curve steadied within the range of 70 to 90. The symptoms of abdominal distress and pressure on the heart and chest rapidly disappeared. The patient became hopeful and then cheerful, joked and conversed in animated fashion and insisted finally that he was feeling too well to remain in the hospital. He said that some business matters needed his attention and that it would relieve his mind considerably if he was allowed to return and take care of them. He was therefore discharged several days before the date previously suggested to him as a possibility. A letter from him several months later stated that he was feeling better than he had for years, that he had been indulging in his favorite sports of hunting and fishing and that he was taking proper care of his business.

Just before discharge the Minnesota Multiphasic Personality Inventory was again administered and the scores were now hypochondriasis 67, depression 65 and hysteria 62.

On the day of discharge, repetition of the fractional gastric analysis after histamine showed a total acidity range of 44 to 69 degrees and a free hydrochloric acid range of 38 to 65.

It is rather difficult to make a definite statement about earlier manifestations of ulcer, but on the patient's arrival at the University Hospital the early recognition of the psychoneurotic and reactive depressive phase of his condition provided the cue for appropriate management. The support of the psychiatric opinion provided by the Minnesota Multiphasic Personality Inventory was no small factor in convincing the surgical staff of the desirability of a psychiatric approach with rapid expansion of the diet to a normal balance and of putting off an operation which would surely have been ill advised. Then too the improvement was measured not only by weight increase, disappearance of symptoms, decreased gastric acidity and a relief of the psychoneurotic tensions but also by lowered scores to the borderline normal range of the inventory.

Incidentally it may be pointed out that many cases which clinically are diagnosed as simple hypochondriasis actually show on the inventory profile the mixed picture of hypochondriasis and hysterical tendencies with a rather high depression score. We interpret the depression as the emotional reaction to the concern over health and as the apprehension regarding an assumed hopeless future involving crippling illness.

CASE 2.—A woman aged 22, unmarried, admitted to the University Hospital Jan. 22, 1942, presented a host of complaints which had been present off and on since childhood. A partial list of her symptoms included "stomach trouble," sharp pain in the flank, occasional transient episodes of blindness, painful cramps in the extremities, chest pain, "awful headaches," low back pain, "drawing feeling in shoulder and neck," dizziness, fainting spells and, particularly after meals, vomiting. Administration of the Minnesota Multiphasic Personality Inventory on January 26 showed a score of 93 on hysteria, 86 on hypochondriasis and 67 on depression; the other scores were clearly within normal bounds. Thus the patient appeared to be both severely hysterical and hypochondriacal and tended to be moderately depressed.

She had first been seen in the outpatient clinic in June 1940, when she complained primarily of pain in the neck, shoulders and upper extremities. Although she presented many psychoneurotic features at the time, the essential complaints referred very suggestively to possible brachial plexus involvement and the x-ray demonstration of very long cervical ribs led to a consensus favoring their removal. This was done on one side but the patient's symptoms continued after removal in almost exactly the same degree and of the same character as previously; in consequence, the opposite anomalous rib was not removed. Subsequently she continued visiting the outpatient department and failed to show any improvement. She appeared rather listless and was a continuous problem because of an occasional seemingly bona fide complaint. For example, during the past year she had noted spontaneous ecchymoses, and the cuff test showed that she did have somewhat fragile capillaries. On Jan. 1, 1942 at the gynecology clinic she complained of intermenstrual bleeding and sufficiently impressed the staff so that dilation and curettement were performed. Microscopic study showed the curettings to be normal endometrium. Since then she has abandoned her household duties, complained of extreme weakness, has been vomiting after meals and has apparently settled down to chronic invalidism.

The patient has always been frail. At the age of 14 she had jaundice, measles and mumps. At 15 tonsillectomy and appendectomy were performed. Following the appendectomy, hemianesthesia developed which persisted for about three weeks. She had German measles in 1940.

The patient completed high school at the age of 15 and was valedictorian of her class. Following graduation she served as school librarian for three years. The patient has always shown some rigidity of makeup, has had unbending religious convictions and has been comparatively sensitive. She was a diligent, conscientious worker. She tended to be withdrawn and somewhat unemotional; she did not cry at all at her mother's funeral.

The family circumstances have long been unsatisfactory. The father was described as congenial with every one except his family; in the family he was overbearing and rather despotic. He was said to have beaten the children brutally at times. He deserted the family a year before the death of his wife. The patient's mother was argumentative, disagreeable and difficult to please. Her death occurred four years before from a carcinoma. After the mother's death the patient tried to take over the household responsibilities for the five younger children but had to have constant help from another woman.

The physical examination revealed no particularly significant abnormalities. The stump of the partially removed left cervical rib could be easily palpated in the supraclavicular region. Generalized weakness of the extremities was present but was paradoxical and variable, so that it seemed apparent rather than real. Laboratory and x-ray studies were negative except for the cervical ribs.

On direct psychiatric examination she appeared preoccupied with her numerous somatic complaints and said especially that she could not keep her food down and that she had stomach (epigastric) pain. The sensorium was intact but her general knowledge seemed considerably restricted to religious topics. Her intelligence quotient was 110. It is difficult to understand how she became the high school valedictorian unless the scholastic competition was very poor in her class. Her mood was indifferent; she was unenthusiastic and her responses were somewhat inadequate. Her ideas were poorly expressed and were at times so loosely stated as to be difficult to understand. There was considerable blocking. The patient appeared somewhat restless and uncomfortable when asked leading questions. Her insight was poor. Her movements were all slow and she leaned against the wall while walking in order to obtain support. She was soft spoken and very passive in her attitude toward the physician and nurses.

Throughout her stay in the hospital she continued to have emesis after meals without preceding nausea. Some new symptoms appeared; she would let her head fall to one side and said she could not hold it erect; similarly she declared that she could not elevate one eyelid which drooped. She complained that she was unable to "think correctly." Two attempts at hypnosis were unsuccessful. For a time she remained uncooperative and wore a self-satisfied smile; for short intervals her behavior bordered on really negativistic reactions. Two weeks prior to discharge, however, she became more accessible, participated in some of the ward routine and developed a slight amount of initiative. On the decision of her guardian, who refused the suggestion of voluntary admission to a state hospital, she was discharged and returned to her home, where it was arranged that an older person would assume most of the household responsibilities.

The diagnosis was considered severe psychoneurosis of the mixed type (hypochondriasis and hysteria). While certain features were decidedly schizoid, it was felt that a diagnosis of schizophrenia was not justified at this time.

The diagnosis on the basis of clinical observation is in accord with the high scores that the patient attained on the inventory in regard to hypochondriasis and hysteria. The borderline depression score of 67 likewise seems indicative of the patient's inner thinking in consideration of the clinical syndrome, though the depression could not be spoken of as beyond that of normal.

CASE 3.—A man aged 22, unmarried, entered the University Hospital on April 1, 1940 because of headache, tinnitus and tenderness of the scalp. He had been followed in the medical and neuropsychiatric clinics for about two months and was then hospitalized because he was making very little progress and intensive management seemed indicated.

The relevant scores on the Minnesota Multiphasic Personality Inventory were hysteria 84 and hypochondriasis 67. The other scores were well within normal bounds, though the depression score was slightly elevated, namely 58.

The patient's illness began in the summer of 1937, when he was working in an ore mine in Bemidji. He was unable to keep up with the amount of work the other boys of his age were accomplishing; they teased him about his low output.

After a time he began to have mild pain in the back and his appetite decreased. He began then to use these symptoms as the reason for his inability to keep abreast of the others. On returning home in the autumn he consulted an irregular practitioner, who placed him on a meat free diet which he observed for over a year. Subsequently he became anemic and because of this, he said, his friends, particularly the girls, began to avoid him, and he turned gradually from a life of physical activity to one of concentration on his junior college studies and interest in trumpet playing. In October 1939 he first noted a dull headache which was bothersome only when he was studying. This gradually became more severe and by Christmas time he could not study at all. The headache disappeared during Christmas vacation, and he worked well in school for three days after the holidays, but then it recurred so severely that he quit school entirely. The headache was persistent from that time and kept him continually at home until he appeared at the outpatient department seeking relief.

The patient had always been a fairly well liked boy, somewhat inferior physically but respected for a relatively superior intellect. He was described as kind, unselfish, well behaved and not suspicious. However, he desired to be a leader among the boys and he would make excuses when he could not function as the leader. His moral code has always been high. He was rather shy and afraid that people were ridiculing him for some indefinite reason.

The family was Slavonian by derivation. The father had been working on WPA, making about $45 a month. The mother had been very solicitous of the patient and acted toward him as if he were the baby of the family needing her protection against the others.

The examination and laboratory studies revealed no serious abnormalities.

The patient's mental status in the hospital corresponded with the anamnestic data. He continually worried about his health and as to whether he would be able to return to school and become a journalist. He complained about many vague and indefinite aches and pains such as eye strain, headaches, backache and anorexia. He asked "Why must I have these headaches?" and said "These headaches are real to me and are severe, even though people might not think so." He stated that he desired to get well and go home. He was oriented in all spheres, did arithmetical problems rapidly and accurately, was well informed on general topics and displayed common sense in matters not connected with his illness. He appeared somewhat anxious, sad and depressed. He declared that he understood that the headaches were functional and could define what is meant by a functional headache; however, his general demeanor was not altogether in accord with this verbal insight. He talked slowly and tried to recite accurately and in detail all of his bodily complaints. On one occasion he made up a list of his complaints so that he could approximate completion of his descriptions of himself in order to make sure that he got all the topics assembled. His attitude and manner and his general appearance were usual for his social level. He was open and accessible to the examiner. On occasion he appeared relatively happy and joined in the activities in the ward with obvious enjoyment.

The patient gradually improved under the hospital care. Following a lumbar puncture a second headache developed which he recognized as quite different from his ordinary cephalalgia; both slowly disappeared. Five days after the puncture he also complained of a pain in the back which he ascribed to the puncture, but he located this pain two vertebral levels above the actual site. This too disappeared, and then all of his complaints began to diminish until finally they were gone. He became interested in his surroundings and requested his discharge because he was feeling so well that he thought he should return home and go back to his school work. He was discharged on April 24, 1940.

The final diagnosis was psychoneurosis, hypochondriasis. The notation was made that, considering the rapid improvement in the hospital environment, the outlook for this boy was probably good if he is not placed under much stress.

Although there is an apparent conflict in the presence of the high score of 84 on the hysterical scale and of a borderline score of 67 on hypochondriasis, as contrasted with the clinical diagnosis of psychoneurosis, hypochondriasis, in actuality the case draws attention to a point which has been driven home to us as a result of the use of the inventory. It has become rather obvious as our cases have accumulated that we were diagnosing as hypochondriasis two different types of case, both of which present the complaint of excessive concern over presumed physical disorder.

In the one the patient expresses the belief that something is seriously threatening his health. He may be convinced, as was our patient 1, that he has a gastric ulcer and that his very life is threatened by the pathologic process. Such an idea may attach itself to a variety of organs (heart, lungs, kidneys or gastrointestinal tract, for example). Most of these conditions appear to grow out of tension states in which some actual bodily change such as palpitation, tachycardia, definite weight loss or muscular twitching gives the patient the notion of bodily disease. Such patients tend to test high on the hypochondriasis score.

The other type is exemplified by patient 3. In this group of individuals there seems to be an environmental setting from which the patient seeks escape or in which he has something to gain by the development of conversion symptoms. While many of these symptoms are often clearly of the conversion type, still in many instances the patient's verbalizations about them are suggestive of true hypochondriacal concern. Yet on the inventory these persons test high on the score for hysteria. Of course, many of the clinical examples of the psychoneuroses are mixed both on the inventory profile and on ordinary psychiatric interpretation. Such cases may easily be mistaken clinically for simple hysteria or hypochondriasis if one does not run exhaustively through one or more detailed interviews.

CASE 4.—A woman aged 25 first came to the University Hospital outpatient department in October 1936, at which time she complained of diplopia when looking to the right, blurred vision, numbness and tingling of the radial portion of the right arm and hand and numbness of both legs. These symptoms had been present for only a few days. The patient said that she had had headaches all her life which were worse in damp weather and appeared mornings and disappeared during the course of the day.

Direct examination medically and neurologically was essentially negative except for a slight decrease in hearing bilaterally and, on ophthalmoscopic examination, slight, probably physiologic blurring of the left disk margins. Most of these symptoms disappeared within a few weeks except for numbness in the finger tips. It was considered that the patient was suffering with a psychoneurosis, but multiple sclerosis could not be satisfactorily ruled out.

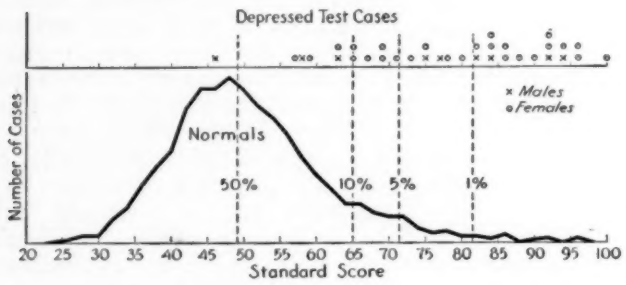
In November 1937 she had a tooth pulled and shortly thereafter there was partial blindness in the right eye. The blindness disappeared within a few weeks, but about a month later, following an attack of tonsillitis, the blindness recurred. Tests for visual acuity at this time revealed 1/100 in the right and 20/15 in the left eye. It was noted that she had some sinus tenderness, and the ophthalmologist thought that she had an optic neuritis on the right with a central scotoma, probably the result of the tonsillitis. The tag of a tonsil was removed and vision returned to 20/25 within a few weeks. She complained somewhat at the time of pain in the back of the neck. She stated that she was rather nervous.

She had no trouble then until December 1939, at which time numbness and tingling recurred in the right leg and her gait became somewhat unsteady, with a tendency for her to fall toward the right side. She stated that she had had occasional

attacks of numbness and tingling of short duration in the left lower extremity and in the left hand. Examination now revealed the following findings: The knee jerks were rather strongly increased and the abdominal reflexes were absent except in the upper quadrants, where they were reduced but equal. She had paresis in flexion and extension of the right leg and in plantar flexion of the right foot; she was unable to perform dorsal flexion of the foot. There was decreased sensibility to cotton and pin from the right hip downward.

The eyegrounds were still equivocal for slightly indistinct margins. During examination she cried several times and indicated that she was not happy in her family relationships but would not discuss the matter at all. Multiple sclerosis still seemed a distinct possibility, but the staff was more impressed at this time by the emotional reactions of the patient. She returned in April 1940. The examination revealed slight nystagmus and hyperactive knee jerks. The left biceps was increased over the right. There was definite weakness of the right leg. Vibration sense seemed reduced, but the patient's responses were somewhat equivocal. It was then considered for the first time that the patient definitely had multiple sclerosis. Subsequently her condition has developed into a typical severe multiple sclerosis.

During her hospital stay in 1940 the personality inventory was administered and it was somewhat surprising to find her scores all within the normal limits: hypochondriasis 62, hysteria 49, psychasthenia 42, depression 46. Evidently this patient was well equilibrated in her basic affect. Most of the symptoms



Composite polygon comprising 690 normal cases constructed with the abscissa scaled in standard scores. Above the polygon are plotted the scores of 35 patients selected at random who had been judged clinically to have depression as a prominent symptom. (Reprinted by permission of the Journal of Psychology.)

that had given rise to the impression of hysteria were actually early evidences of the disseminated sclerosis. Her peak score of hypochondriasis 62 probably represented her concern over her illness, which was indeed organic.

The findings of a normal personality profile in this patient, who was long suspected of presenting conversion symptoms, were potent evidence of the probable mistake in such an interpretation. In retrospect it is obvious clinically that multiple sclerosis was developing and that the fluctuating sensory and motor symptoms actually represented the onset of the disease. This diagnostic dilemma in differentiating hysteria from multiple sclerosis is an old one which is still bothersome even to the experienced neurologist. The inventory is thus shown to have value not only in demonstrating the presence of a psychoneurosis but also when it is within normal range, in giving precision to one's thinking in ruling out psychoneurotic reactions in cases of uncertainty.

VALIDITY OF THE INVENTORY

For the purposes of a paper like the present one, it would of course be a simple matter in a series of cases as large as the one we have accumulated to select those for report which illustrate most vividly the positive correlation between clinical opinion and inventory profile, thus leaving a more favorable impression of one's work than would be warranted on examination of the complete data. Without getting into a detailed discussion of the statistical reliability and validity of the various scales, because this is being presented in our other papers, we should like merely to call attention to the results of one of our scores (depression), as illustrated in the chart. This is approximately representative of the other scales that have so far been developed from the inventory.

This chart shows the results in terms of a frequency polygon of scoring 690 normal persons within the age range 16 to 65 on the scale for depression. The horizontal coordinate (abscissa) gives the standard score, with 50 representing the average for the normals on this scale and 10 points representing one standard deviation, 20 points two standard deviations and so on above or below this average. The 1, 5, 10 and 50 per cent points are marked as they were obtained with the origin at the depressed end of the distribution. The percentages refer to the proportion of patients among normals scoring above each of the points indicated. Thus only 1 per cent of normal persons obtain a depression score above 82. Since there is considerable skewness to the curve, these percentage points do not coincide with standard values mathematically predictable for a normal distribution curve. Above the polygon, plotted on the same standard abscissa, are the individual scores of 35 depression cases which were assembled to test the validity of the depression score. Thirty-four of these test patients obtained scores higher than 50, which was the average of the normals. It is apparent that there is considerable overlap between the upper group of normals and the depressive test patients. Doubtless several factors may be operating to explain this state of affairs. On the one hand, for example, the clinical diagnosis of depression is not always necessarily correct; thus some of the test patients may have been selected with more or less clinical error involved, although all the persons used were intensively studied by the psychiatric staff. Furthermore, the reactive depressions tend to recover rather promptly, and some of our test patients were given the inventory following improvement. Such an improvement is exemplified by case 1. Then, too, an undetermined number of the normal persons were probably actually depressed at the time they were tested. This may be particularly true of a random sample of hospital visitors whose relatives or close friends are involved in serious health problems; it is to be kept in mind that our "normals" were made up primarily of such a group of visitors.

REACTION OF PATIENTS TO ADMINISTRATION OF THE INVENTORY

Objection has occasionally been raised against this kind of a technic in psychiatric cases because of an assumed mental trauma from the suggestion of symptoms or attitudes contained in some of the items making up the inventory. Indeed at the beginning of this study the first few clinical subjects were picked with the thought that those particular individuals would not be disturbed by any of the items. We soon learned, however, that the subject was indeed a rare one who showed sufficient curiosity about the matter to do more than ask a few questions. As a matter of fact, some patients with psychoneurotic tensions express relief after responding to the items because they feel that they have reported on many points to the physician about which they otherwise might not have told him. In these cases the

inventory acts in similar fashion to the conventional mental catharsis so often made use of by the psychotherapist.

GENERAL COMMENT

Because of its ease of administration and its valid characterization of persons psychiatrically in quantitative terms, the Minnesota Multiphasic Personality Inventory has proved very useful in the University of Minnesota Hospital. That similar advantages would accrue to its use in general medical and surgical practice seems evident to us. The identification of the psychoneurotic individual and the determination of the degree of his hypochondriacal, hysterical, phobic and depressive reactions provide warning signals for the surgeon and give an indication of the need for psychotherapeutic management regardless of the presence or absence of material organic disease. The other scales, which are available in tentative form, provide data concerning the person which are also of considerable psychiatric importance, but discussion of these scales will be deferred for a later communication. To some extent, the profile identifies not only the psychoneurotic person but also certain types of the major psychoses. As yet a satisfactory detector for schizoid tendencies is not available, but progress is being made in this direction which indicates that the inventory [2] contains the items necessary for detection of such trends.

SUMMARY

1. The Minnesota Multiphasic Personality Inventory is an aid in the detection, characterization and measurement of psychoneurotic trends.

2. The cases presented demonstrate the value of this technic in assessing the strength of the neurotic element in differential diagnosis in medical and surgical as well as in psychiatric practice.

3. The inventory is also valuable in ruling out psychoneurotic trends when they are absent and thus sharpens one's thinking as to the likelihood of the presence of subtle, early symptoms of confusing conditions, such as multiple sclerosis.

4. The inventory is simple to use and to interpret and provides a large amount of psychiatric information about patients with a minimal amount of the physician's time.

2. The sets of materials for the Minnesota Multiphasic Personality Inventory are produced and are on sale by the University of Minnesota Press, Minneapolis.

Indigestion in Wartime.—Modern war, waged on an unprecedented scale, has brought about conditions which have never been encountered before in the history of the world. Not only has the method of waging war been completely altered, but war today has entered every household and brought about conditions unparalleled in all the experience of the human race. The dislocation of our method of living—economic and social—apart from the immediate military problems has resulted in changes which are bound to find their repercussions in the life of every individual. The war has been responsible for uncovering latent disease, revealing weaknesses in our structural make-up, and it has often demanded sudden and severe changes in our methods of living. Despite the great advances which science has made in the promotion of human health and happiness, the demands of a modern wartime economy are so severe as to threaten the life and outlook of every one seriously. The transition to wartime conditions has revealed situations which were scarcely understood in the peacetime era.—Rehfuss, Martin E.: Indigestion: Its Diagnosis and Management, Philadelphia, W. B. Saunders Company, 1943.

THE MORPHOLOGY OF TREPONEMA PALLIDUM IN THE ELECTRON MICROSCOPE

DEMONSTRATION OF FLAGELLA

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In a recent issue of THE JOURNAL we published a short note on the appearance of Treponema pallidum when seen under the electron microscope.[1] All the preparations were specimens recovered directly from human material, for the most part primary and secondary lesions.

When the preparations were examined in the electron microscope we were unable to discern flagella

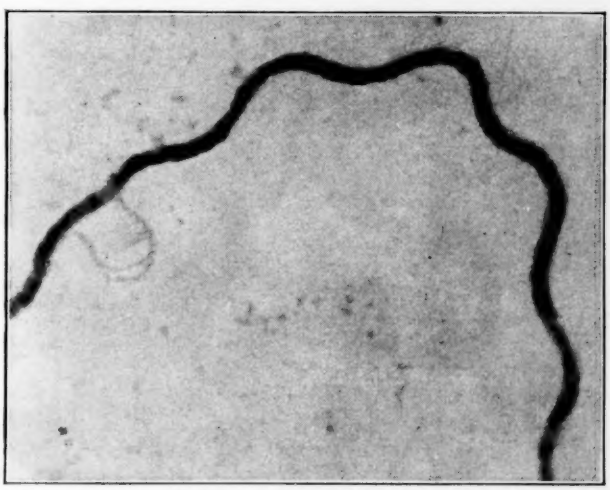

Fig. 1.—Reduction from 80,000 diameters of a portion of Treponema pallidum showing flagella.

despite all the evidence which points to their presence when visualized in the living state by darkfield illumination.

In a footnote in our original contribution we stated that flagella-like processes were demonstrable by careful inspection of the photographic plate. This apparent difference between what can be seen on the fluorescent screen of the microscope and what is evident on the photographic plate is due to the lesser resolving power of the fluorescent screen.

In the investigation of bacteria, including Treponema pallidum, with the electron microscope, a magnification of approximately 9,000 diameters has been found to give the best operating conditions, although magnification of at least twice this amount is possible with the instrument.[2]

In order to study the flagella-like processes more carefully, we enlarged the photographic reproductions tenfold. The processes resemble in all respects flagella which have been demonstrated in other bacterial forms,

This work was aided by a grant from the Board of Governors of the Horace H. Rackham School of Graduate Studies.

1. Wile, U. J.; Picard, R. G., and Kearney, Edna B.: The Morphology of Spirochaeta Pallida in the Electron Microscope, J. A. M. A. **119:** 880 (July 11) 1942.

2. Picard R. G.: Thesis.

occurring at different levels of the organism, but as yet we have not succeeded in finding them at the end. There is, however, every reason to believe that they occur here as well as elsewhere.

The detection of flagella-like processes in preparations of Treponema pallidum has been a sufficiently frequent finding to justify the assumption that they are an integral part of the organism and probably are invariably present. The technical difficulties attendant on the preparation of fresh specimen from the human host, together with the frequency with which débris interferes with good reproduction, accounts for their not being an entirely uniform finding.

An electron micrograph of Treponema pallidum appeared shortly after our first contribution in an article by Mudd, Polevitzky and Anderson.[3] In their paper flagella are shown in a photographic reproduction. The organism, however, which these authors studied came from a culture on cysteine-ascitic fluid broth which was derived from the well known Noguchi rabbit strain. The occurrence of similar processes in the organism

Fig. 2.—Somewhat higher magnification showing larger number of flagella-like processes in detail.

derived from the rabbit testis and carried through culture is confirmatory evidence of our observation.

In discussing the morphologic features of the Nichols strain of Treponema pallidum as revealed by the electron microscope, Morton and Anderson[4] mention flagella-like filaments and terminal filaments. These are shown and appear to be identical with those described herein. In their material, as in the article referred to by Mudd, Polevitzky and Anderson, organisms from cultures were examined. Not only are these morphologically different from those taken fresh from syphilis lesions when seen in the electron microscope, but they differ also when seen fresh in the darkfield. It is also noteworthy that organisms from such cultures after several generations are no longer pathogenic to rabbits.

However, except for the fact that the gross morphology of the organism is different from that seen in our fresh specimens, the flagella-like structures are identical with those described by us from the human strain.

3. Mudd, Stuart; Polevitzky, Katherine, and Anderson, T. F.: Bacterial Morphology as Shown by the Electron Microscope, Arch. Path. **34**: 199 (July) 1942.

4. Morton, H. E., and Anderson, T. F.: Some Morphologic Features of the Nichols Strain of Treponema Pallidum as Revealed by the Electron Microscope, Am. J. Syph., Gonor. & Ven. Dis. **26**: 565 (Sept.) 1942.

THE EFFECT OF SULFONAMIDE DRUGS ON THE BLOOD PLATELETS

REPORT OF TWO CASES OF THROMBOPENIC PURPURA AND EXPERIMENTAL STUDIES ON PATIENTS RECEIVING SULFONAMIDE DRUGS

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It is now a well recognized fact that the entire group of sulfonamide compounds can be added to those which may produce various disorders of the blood. Thus the rather high incidence of acute hemolytic anemia in patients receiving these drugs is now well established, as well as is the fact that the drugs are capable of producing acute agranulocytosis. Furthermore, in some instances they are capable of stimulating granulopoietic activity to the point of producing leukemoid reactions. This makes it all the more remarkable that very few reports have been presented indicating that these compounds are capable of affecting the blood platelets.

During the past eighteen months we have had an opportunity to study 3 cases in which thrombopenic purpura presumably developed because of the administration of sulfathiazole. Reports of 2 of these are incorporated in this paper, the third being omitted because of circumstances whereby we are unable to obtain detailed information.

REPORT OF CASES

CASE 1.—A woman aged 40, admitted to St. Joseph's Hospital, Atlanta, Ga., Aug. 1, 1941 as a patient of Drs. Avary Dimmock and John Turner, complained chiefly of excessive vaginal bleeding during the preceding ten days. She had never had irregularity in menstruation before. During these ten days the bleeding had been more or less continuous, requiring the uninterrupted use of a large number of pads.

Physical examination revealed a decided pallor because of the excessive loss of blood. Otherwise there were no physical manifestations of importance. There were no purpuric spots on the skin nor was there any other evidence of hemorrhage except the constant oozing of blood from the uterine canal. The temperature was 102 F., the pulse rate 90 and respiratory rate 24 a minute.

Examination of the blood on admission showed 40 per cent hemoglobin and 2,800,000 red cells and 4,500 white cells per cubic millimeter with a normal differential cell count. The coagulation factors, including the coagulation time, bleeding time, clot retraction time and prothrombin time, were normal. The platelets were not counted by a direct method but were estimated on the blood film to be more than 300,000 per cubic millimeter. A tentative diagnosis of incomplete abortion was made, with a second diagnosis of a bleeding submucous uterine fibroid. The patient was given a blood transfusion and this was followed by uterine dilation and curettage. The tissue obtained showed only blood clot with no products of conception. The vagina was packed, and because of her septic course she was given 3 sulfathiazole tablets every three hours for twenty-four hours, then 2 tablets every four hours for the second two days, thus receiving 16 Gm. in three days. After three days the medication was changed to sulfapyridine, and after one day this was omitted. Twenty-four hours after the first administration of sulfathiazole the patient had bleeding in the gastrointestinal tract as shown by bloody vomitus and dark

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tarry stools. The uterine bleeding continued unabated. She vomited blood on several occasions and after forty-eight hours there were numerous ecchymotic areas and petechial hemorrhages over the trunk, extremities and face. Examination of the blood at this time showed 2,200,000 red cells per cubic millimeter, hemoglobin 40 per cent, and 3,000 white cells, and the differential count was essentially normal except for a slight shift to the left in the granulocytes. The platelets were extremely few and estimated to number less than 5,000 per cubic millimeter. A careful examination of the blood showed no immature white cells indicative of a leukemic process. There was a positive tourniquet test. In addition to the admission diagnoses, a diagnosis was then made of thrombopenic purpura, presumably following the administration of sulfathiazole. The patient was given multiple transfusions but continued to run a septic course and died August 15, two weeks after admission to the hospital.

The autopsy findings included many hemorrhagic areas beneath the skin, in the mucous membranes and in the gastrointestinal tract. The kidney pelves were filled with blood clot. About the uterus in the cul-de-sac there was a considerable amount of purulent material. The tubes were quite large, adherent to the ovaries and surrounded by inflammatory exudate. The uterus contained a large submucous fibroid tumor that was pedunculated, soft and dark red with a bleeding surface. The autopsy diagnosis was abscess of the pelvis and cul-de-sac, presumably arising from the tubes; multiple hemorrhages of the small intestine, trunk, face and extremities, and a submucous pedunculated bleeding fibroid tumor.

This report indicates that the patient's original uterine bleeding prior to admission to the hospital was caused by the fibroid tumor and that pelvic inflammatory disease accounted for her febrile course. The important feature in this case was that her blood platelets were entirely normal on admission to the hospital and she showed no evidence of blood coagulation defects to account for her bleeding; this condition developed only after a moderate amount of sulfathiazole had been administered. Consequently it is believed that the thrombopenic purpura was caused by the administration of that drug, since no other drugs were employed during this period that could account for the sharp platelet depression.

CASE 2.—A white woman aged 23 was admitted to Piedmont Hospital, Atlanta, Ga., on March 1, 1941 and died on March 5. She was a patient of Drs. H. C. Sauls and Carter Smith. On admission her chief complaint was severe backache, general malaise, nausea, vomiting and sore throat. For two days before she had passed only a small amount of red bloody urine. She had been well up until eleven days before admission, at which time a sore throat developed. At that time her family physician gave her 10 grains (0.65 Gm.) of sulfathiazole every two hours for two days. On the third day she began to have pain in her back, passed small amounts of red urine and had nausea, vomiting and some swelling of the face. This continued until admission to the hospital.

Her temperature was 99.6 F., pulse rate 76, respiratory rate 18 and blood pressure 140 systolic and 90 diastolic. She was quite listless and almost semicomatose. There was no lymphadenopathy or splenomegaly. The admission diagnosis was streptococcic pharyngitis and acute hemorrhagic nephritis, presumably from sulfathiazole. On the second hospital day only 12 ounces (360 cc.) of urine was excreted and on the night of the third day numerous purpuric spots developed over the arms and trunk with uterine bleeding and expectoration of bloody sputum.

On admission to the hospital examination showed 4,300,000 red cells and 14,000 white cells per cubic millimeter, hemoglobin 13 Gm. and a slight shift to the left of the granulocytes. No platelets were seen on the stained smear. The blood coagulation factors including coagulation and prothrombin times were normal. Bleeding time by skin puncture was more than thirty minutes and the tourniquet test was strongly positive. The clot failed to retract and no platelets were found on the blood film. Finally the patient had retention of nitrogenous products until March 5, the day of her death.

The patient was given no drugs other than sulfathiazole prior to the development of her purpuric disease. The Kahn test gave negative results on two occasions. Although she had received no sulfathiazole for a period of nearly one week prior to admission to the hospital, on the second hospital day sulfathiazole determinations of the blood showed 1.8 mg. per hundred cubic centimeters.

This appeared to be a clearcut case of severe thrombopenic purpura which presumably followed the administration of a relatively small amount (about 10 Gm.) of sulfathiazole over a period of only two days, associated with kidney damage producing retention of nitrogenous products and death. The course of events in this case was probably an original streptococcic sore throat in a previously healthy person, the administration of sulfathiazole, the development of kidney blockage, hematuria, thrombopenic purpura and finally pulmonary hemorrhages and death. Unfortunately, consent for autopsy could not be obtained.

TEN REPORTED INSTANCES

When compared to the number of cases of acute hemolytic anemia and acute agranulocytosis reported from the administration of the sulfonamide drugs, reports of thrombopenic purpura have been relatively infrequent. We have been able to find records of only 10 patients in whom thrombopenic purpura presumably developed after the administration of these drugs.

Schonberg's [1] patient was treated for dermatitis of the vulva with left inguinal streptococcic adenitis and was given 120 grains (8 Gm.) of sulfanilamide on the first day and 40 grains (2.6 Gm.) for two subsequent days. On the fourth day urticaria developed, associated with a typical purpuric rash. This patient recovered, and one month later she was given one 5 grain (0.3 Gm.) tablet of sulfanilamide, which was followed by a generalized urticarial eruption. In this instance the purpura presumably was not thrombopenic but developed because of widespread capillary damage.

Markel and Rike's [2] patient was a man aged 59 being treated with sulfanilamide for postoperative cystitis. He received 30 grains (2 Gm.) on the first day, 15 grains (1 Gm.) on the second, 30 grains on the third, and 30 grains on the fourth day, at which time his stools contained gross blood with bloody urine and widespread purpura. Examination of the blood showed a depressed platelet count and delayed clot retraction, with other coagulation factors normal. These authors concluded that the bleeding in their case was caused by the sulfanilamide.

Other instances of purpuric disorders have been reported following administration of sulfapyridine. Thus Aubertin and May-Darhovsky's [3] patient was a white woman aged 38 being treated for arthritis with sulfapyridine. Over a period of ten days she received slightly more than 300 grains (20 Gm.). On the twelfth day there was a petechial eruption on the lower extremities and the blood platelets numbered 130,000 per cubic millimeter. The bleeding time was prolonged and the coagulation factors were normal. Cessation of administration of the drug was followed by recovery of the patient.

1. Schonberg, I. L.: Purpuric and Scarlatiniform Eruption Following Sulfanilamide, J. A. M. A. **109:** 1035 (Sept. 25) 1937.
2. Markel, C., and Rike, B. J.: Symptomatic Purpura Hemorrhagica Following the Administration of Sulfanilamide, Rocky Mountain M. J. **36:** 793 (Nov.) 1939.
3. Aubertin, C., and May-Darhovsky: Purpura Due to Sulfapyridine, Bull. et mém. Soc. méd. de hôp. de Paris **56:** 360 (Aug. 8) 1940.

The patient of Goldbloom and his associates [4] was a woman aged 50 treated with about 60 grains (4 Gm.) of sulfapyridine one day and 90 grains (6 Gm.) the second day, this being followed by development of hemorrhages in the form of bloody sputum, hemorrhagic masses in the mucous membranes, moderate vaginal bleeding and diffuse purpura of the skin. After the drug was discontinued these manifestations disappeared. In this instance the purpura developed on the fourth day of treatment and the platelet count was 25,000 per cubic millimeter, associated with a leukemoid reaction to the extent of 35,000 white cells per cubic millimeter.

TABLE 1.—*The Diluting Fluid Used in Olef's Method*

Sodium metaphosphate (Howe & French)	1.0 Gm.
Sodium chloride	0.4 Gm.
Dextrose	0.1 Gm.
Sodium bicarbonate	0.1 Gm.
Brilliant cresyl blue	0.15 Gm.
Distilled water	100.0 cc.

TABLE 2.—*Normal Daily Variations in Platelets in Healthy Adults*

Normal Subject	Daily Platelet Count (in Thousands)									
	1	2	3	4	5	6	7	8	9	10
1	514	480	429	362	274	309	300	349	356	264
2	264	367	407	284	319	395	507	399	514	451
3	270	242	427	288	251	366	320	307		
4	307	364	275	318	336	432	431			
5	322	258	331	388						

Hoffman's [5] patient was a man aged 57 with a postoperative urethral discharge from a transurethral prostatic resection being treated with 60 grains (4 Gm.) of sulfapyridine in one day. This was followed by bloody urine, bleeding from the gums and a hemorrhagic rash on the lower extremities. This patient was in the hospital for several weeks under close study before the drug was given, and no hemorrhages had been present before.

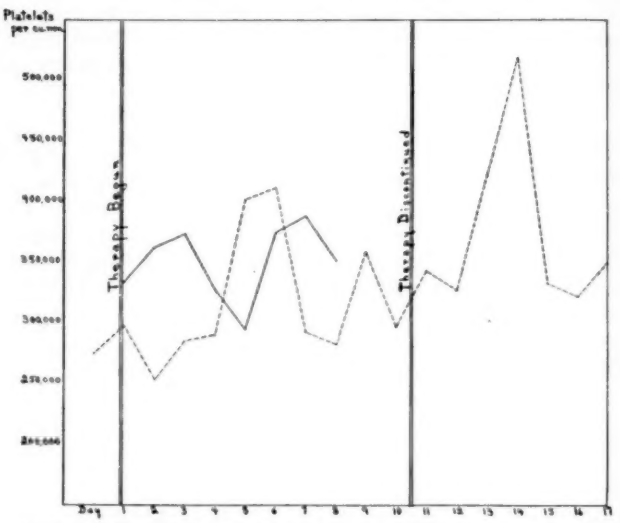
TABLE 3.—*Platelet Determination by Three Methods in Normal Subjects*

Subject	Direct Method	Fonio's Method	Olef's Method
1	212,000	443,520	485,100
2	259,000	291,200	565,760
3	325,000	445,410	456,520
4	238,000	353,760	378,210
5	274,000	367,920	443,520
6	224,000	481,320	492,780
7	200,000	303,750	252,350
8	235,000	378,020	378,020
9	224,000	374,000	204,250
10	209,000	351,000	369,000
11	270,000	298,960	319,160
12	312,000	330,600	364,800
13	334,000	374,320	351,260
14	265,000	340,180	407,420
15	391,000	419,220	493,200
16	290,000	252,450	362,610
17	219,000	202,350	276,900
18	244,000	283,930	291,830
19	367,000	450,300	677,150
20	209,000	300,300	373,230
21	420,000	425,200	463,200
22	258,000	360,000	423,150
23	243,000	337,400	404,880
24	428,000	501,000	527,940
25	342,000	333,000	397,600
26	180,000	240,000	350,620
27	294,000	328,400	351,740
Averages	277,000	351,000	400,000

Russell and Page [6] have reported 2 cases of thrombopenic purpura resulting from administration of sulfapyridine. The first report was of a Negro man aged 41 with lobar pneumonia. During a period of ten days he received 45 Gm. of the drug. On the eleventh day he had generalized purpura involving the entire body, epistaxis and oozing from the gums. The platelets were estimated to be 45,000 per cubic millimeter. The patient eventually recovered. In this instance the blood sulfapyridine level was only 2.9 mg. per hundred cubic centimeters.

Their second report was of a white man aged 60 with lobar pneumonia who received 18 Gm. of sulfapyridine in four days; on the fourth day hematuria and generalized purpura developed. Acute hemolytic anemia with moderate leukocytosis developed and the platelets numbered less than 1,000 per cubic millimeter. He had prolonged bleeding time and normal coagulation factors. He died on the fourteenth day and bone marrow studies revealed no findings of particular significance.

Up to this time there have been reported 3 instances of thrombopenic purpura after the administration of sulfathiazole. Quick and Lord's [7] patient was a white youth aged 19 who had been given 70 grains (4.5 Gm.) of sulfathiazole for infection of the gums following extraction of teeth. Severe acute hemolytic anemia developed and on the ninth day a purpuric rash appeared over the entire body which presumably was caused by the administration of the drug, since other factors were fairly well eliminated.



Average daily variation in the number of platelets in normal subjects (solid line; details in table 2) and in patients during and after sulfathiazole therapy (broken line; details in tables 4, 5 and 6).

The second instance of thrombopenic purpura from sulfathiazole was reported by Rosenfeld and Feldman: [8] A white man aged 37 was being treated for cystitis, pyelitis and pyelonephritis with sulfathiazole. After taking 5.5 Gm. of the drug he began to bleed from the nose and gums and also had hematuria. After the drug had been given three days his platelets numbered only 2,000 per cubic millimeter. The drug was discontinued and the patient recovered. It is interesting to note that several weeks later he was given 15 Gm. of sulfathiazole in a period of five days, but after this administration there was no thrombopenia and no development of purpura.

4. Goldbloom, A. A.; Greenwald, Louis, and Reinstein, Harry: Toxic Reactions to Sulfapyridine, J. Lab. & Clin. Med. **27:** 139 (Nov.) 1941.
5. Hoffman, C. A.: A Report of a Case of Hemorrhagic Purpura Due to Sulfapyridine, West Virginia M. J. **36:** 169 (April) 1940.
6. Russell, H. K., and Page, R. C.: Thrombocytopenic Purpura Due to Sulfapyridine, Am. J. M. Sc. **200:** 495 (Oct.) 1940.
7. Quick, E. W., and Lord, F. D.: Acute Hemolytic Anemia Following Sulfanilamide Administration: Report of a Case with Recovery, J. A. M. A. **117:** 1704 (Nov. 15) 1941.
8. Rosenfeld, Samuel, and Feldman, Frederic: Thrombopenic Purpura Due to Sulfathiazole, J. A. M. A. **118:** 974 (March 21) 1942.

Werner's [9] patient developed only a cutaneous rash after receiving 14 Gm. of sulfathiazole, but twenty days later complete thrombopenia developed after administration of only 1 Gm. of the drug. Such instances would suggest that a patient may become sensitized by the first administration of these drugs.

Thus in a summary of the reported cases of purpura caused by these drugs 2 of them have resulted from the administration of sulfanilamide, 5 from sulfapyridine and 3 from sulfathiazole. To this we add the 2 cases reported in this paper, making a total of 12.

A STUDY OF THE PLATELETS IN PATIENTS RECEIVING SULFONAMIDE COMPOUNDS

After observing 3 patients who had been treated with sulfathiazole and who subsequently had severe hemorrhages with ultimate death of all, we decided to investigate the effects of sulfathiazole on the platelets of patients who were receiving this drug in routine hospital practice.

It became necessary to select a satisfactory method for the estimation of platelets, and we first made platelet determinations by the three standard methods on 27 normal subjects. The platelets were estimated by the direct method, Fonio's method and Olef's method. The blood for the three tests was taken from the normal subjects at the same time.

The direct method consists of puncturing the finger, wiping away the first drop of blood, drawing diluting fluid to the 0.5 mark and then blood to the 1.0 mark in a red cell pipet and then diluting fluid to fill the pipet. The fluid used was that of Rees and Ecker and is an aqueous solution containing sodium citrate and solution of formaldehyde with a small amount of brilliant cresyl blue. After proper shaking of the pipet the counting chamber is filled and allowed to stand for fifteen minutes on damp filter paper in a petri dish. The platelets are then counted. By this method the platelet count is usually between 250,000 and 350,000 per cubic millimeter, with extremes of 200,000 and 450,000 per cubic millimeter. The average platelet count on 27 normal subjects was 277,000 per cubic millimeter.

Fonio's smear method consists of puncturing the finger and at once placing a drop of 14 per cent magnesium sulfate over the puncture before the blood begins to flow. The blood then flows into the drop until the proportion is about one part of blood to one part of magnesium sulfate solution. A small drop is then placed on a slide and a thin smear is made. The magnesium sulfate is then wiped away and an ordinary red cell count is done by the usual technic. The smear is stained with Wright's stain, the platelets are counted with the oil immersion objective until 1,000 red cells in various microscopic fields have been simultaneously enumerated. From these data the number of platelets is computed. In the group of 27 normal persons the average platelet count was 351,000 per cubic millimeter.

The third method used is known as Olef's paraffin cup method: The finger is punctured, the first drop of blood removed and a drop of diluting fluid placed over the puncture. The formula for the diluting fluid used in Olef's method is given in table 1. The blood then flows into the fluid in approximately equal amounts, and this mixture is received into a small paraffin cup which contains more of the diluting fluid. After being stirred with a paraffin coated applicator and allowed to stand for two minutes, it is transferred to a slide in the form of a small drop sufficient to spread under a cover glass. After standing for fifteen minutes, simultaneous counts are made of platelets and red cells and the number is then computed. By this method the usual range is 350,000 to 400,000 per cubic millimeter.

After this preliminary study, we decided to use Fonio's smear method for further studies. We based this decision on the fact that this method has the advantages of simplicity and, second, of providing a permanent preparation. The results obtained by this method are within 10 per cent of those obtained by the Olef method, which is probably more accurate. In any event, once a method has been chosen for routine purposes it should be used to the exclusion of all others, so that platelet estimations will have comparative value. The individual counts in this study of 27 normal persons is given in table 3.

TABLE 4.—*Platelet Counts in Patients Under Sulfathiazole Therapy*

Patient	Day of Therapy									
	0	1	2	3	4	5	6	7	8	9
1*	...	700	900	600	660	720	650	660	840	...
2	320	300	320	300	...	...	...	...	...	...
3	...	340	350	370	360	420	470	...	...	...
4	...	370	410	390	450	630	...	...	...	...
5	...	570	510	480	340	420	...	...	...	...
6	...	400	370	500	430	...	...	...	...	...
7	...	380	400	340	370	...	...	...	...	...
8	290	340	340	375	...	...	...	...	...	...
9	...	320	500	450	590	530	510	...	...	...
10	...	280	400	460	320	350	...	...	...	...
11	...	270	250	240	280	380	...	...	...	...
12	...	490	500	630	910	610	500	...	...	...
13	280	280	220	280	210	220	...	...	...	...
14	...	240	320	330	...	...	...	...	...	...
15	...	260	470	330	...	...	...	...	...	...
16	...	420	360	500	400	...	...	...	...	...
17	350	410	380	410	...	...	...	...	...	...
18	...	350	420	360	...	...	...	...	...	...
19†	...	280	290	...	...	...	...	...	...	...
20	420	300	...	...	...	...	...	...	...	...
21	330	300	290	230	300	310	220	...	...	...
22§	...	270	150	300	200	260	300	290	270	...
23	180	200	350	300	280	...	...	...	...	...
24	210	230	210	220	...	...	...	...	...	...
25	...	130	230	260	...	...	...	...	...	...
26	...	290	300	290	350	...	...	...	...	...
27	340	360	250	230	260	300	260	...	...	...
28	380	310	...	...	...	...	...	...	...	...
29	...	250	160	260	210	...	...	...	...	...
30	...	280	240	240	260	...	...	...	...	...
31	...	450	340	330	...	...	...	...	...	...
32	280	290	300	300	...	...	...	...	...	...
33	220	300	190	230	...	...	...	...	...	...
34	170	200	220	200	...	...	...	...	...	...
35	160	200	210	190	200	...	...	...	...	...
36	230	320	280	290	...	...	...	...	...	...
37	300	350	300	280	...	...	...	...	...	...
38	...	311	149	249	...	...	...	...	...	...
39	...	308	304	251	167	761	...	...	...	...
40	...	...	...	...	65	196	...	...	...	...
41	...	...	305	253	...	...	...	...	...	...
42‡	...	...	341	235	...	...	...	...	...	...
			317	204						
43	...	...	299	236	384	230	...	687	362	267
44	...	...	149	217	256	...	...	...	...	...
45	...	...	289	397	354	285	...	301	239	232
46	...	...	357	121	426	...	...	...	...	...
48	...	...	313	197	...	326	...	...	...	...
49	...	...	640	439	...	527	862	641	...	...
50	...	...	427	481	273	550	249	...	...	...
51	...	...	185	205	473	258	...	...	...	...
52	...	...	199	159	280	...	283	229	281	364
53	...	375	289	280	...	586	528	...	...	...
54	...	...	330	229	412	...	...	...	...	...
55	...	330	217	199	247	...	...	...	...	...
57	...	263	287	...	293	170	262	553	...	...
58	...	312	...	245	215	...	...	...	...	...
47*	...	...	617	455	676	...	468	525	285	740
56	...	524	452	...	332	564	512	385	427	572
59	...	448	...	270	334	518	...	...	...	...
60	...	290	511	869	708	747	443	...	...	...
61	...	...	224	271	161	...	277	...	...	...

* Patients 1 through 18 and 47, 56, 59, 60 and 61 were infants and children aged 4½ months to 12 years

† Patients 19 through 58 as they appear in the table were aged 13 to 81 years. Patients 34 through 37 were over 70 years of age.

‡ Patient 42 received sulfathiazole for two days, had chemotherapy discontinued for five days, and received a second course of the drug for three days.

§ Patient 22 was continued on sulfathiazole therapy for ten days and showed a platelet count of 400,000 on the ninth and on the tenth day.

9. Werner, W. I.: Thrombocytopenic Purpura Following Administration of Sulfathiazole: Case Report, Southwest. Med. **26:** 49 (Feb.) 1942.

Since the platelet counts may vary widely in the same individual from day to day, this has to be taken into account in an evaluation of the platelet fluctuations of patients under treatment. We decided to carry out daily platelet counts at approximately the same hour of the day on 5 normal subjects for a period of ten days. The results of this can be seen in table 2.

It can be seen from this study that the platelet count may vary from 264,000 to 514,000 per cubic millimeter in a normal person and in another subject from 264,000 to 407,000 per cubic millimeter, so it is obvious that great variations occur from day to day in the normal platelet count of the same individual, even when the counts are made at the same time of day with a standardized, carefully worked out technic.

Platelet determinations were begun on patients who were admitted to the hospital for various causes and who were receiving or were to receive sulfathiazole therapy for a variety of conditions. This series included 61 patients all of whom received therapy over a variable number of days usually ranging from three days to eight days, and longer in an occasional instance. In a group

TABLE 5.—*Average Platelet Counts in Patients with Sulfathiazole Therapy*

	Day of Therapy										
	0	1	2	3	4	5	6	7	8	9	10
Children.....	357	392	376	419	476	460	506	457	717	...	...
Adults.....	257	296	253	384	290	401	411	293	283	357	296

TABLE 6.—*Average Platelet Counts in Relation to Days After Discontinuance of Sulfathiazole*

	Day After Discontinuation						
	1	2	3	4	5	6	7
Children.....	417	495	622	821*	554	...	...
Adults.....	343	326	421	517	333	322	352

* Count made in 1 case only.

of 23 of these 61 patients it was possible to obtain platelet counts before the institution of drug therapy. The results obtained on each patient can be seen in table 4, and in table 5 is a summary of the results.

These results indicate that there is but little significant difference between the platelet counts of the patients before drug therapy is given and the counts obtained on the first, second and third days of therapy, but in nearly all patients after therapy has been discontinued there is a fairly sharp rise in the number of platelets. These averages are expressed in table 6 and are presented graphically in the chart.

Thus in 23 patients the average platelet count on the day before drug therapy was 275,000, on the first day of therapy nearly 300,000 and on the second day of therapy 250,000, which was below the average level in the beginning. On the day that therapy was discontinued the average platelet level was nearly 350,000 but on the following day it rose to 525,000 and then again fell back to its normal level.

The results would seem to indicate that in patients receiving sulfathiazole therapy there is a slight depression of the platelets on the second day of therapy and a decided increase in the number on the day after therapy has been discontinued. Because of the wide variation in normal platelet counts, conclusions to be drawn from the platelet values of these 61 patients cannot be done with any degree of certainty. We can merely state that there seems to be a trend toward slight platelet depression after the institution of therapy and a considerable increase in the number of platelets after cessation of therapy. This trend, coupled with the 2 cases reported in this paper and those in the literature, indicates that in some instances platelet depression may occur to the point of thrombopenic purpura.[10]

CONCLUSIONS

1. There appears to be accumulating sufficient evidence to indicate that in occasional patients being treated with the sulfonamide compounds the blood platelets may be depressed to the extent of producing severe thrombopenic purpura.

2. A comparative study on normal subjects indicates that Fonio's method is sufficiently reliable and simple to be preferred as a routine procedure.

3. Daily platelet counts in normal persons over a period of ten days revealed decided variations in the number of platelets in the same individual.

4. Daily platelet estimations were carried out in 61 patients being treated with sulfathiazole, and the results indicate that there is a slight platelet depression on the first day of treatment and a rather decided increase of platelets on the first day after cessation of treatment.

5. The fact that the sulfonamide compounds appear to be capable of depressing platelets in an occasional person makes it all the more important that these drugs should be used with caution only under supervision of physicians and that hematologic studies should be done frequently to determine any untoward effects on the blood.

ABSTRACT OF DISCUSSION

DR. DAVID I. MACHT, Baltimore: I was pleased with the call for a more intensive study of the morphology of the blood and other histologic changes as to the sulfonamide compounds. I would advocate not only hematologic but pharmacologic studies of the blood after the administration of these valuable therapeutic agents. I have been interested in the skin reactions after all the sulfonamide drugs because one of these resembles a fatal disease, pemphigus. Pemphigus eruptions have been described after sulfathiazole and other sulfonamides. I have made experimental studies on the subject. We gave various sulfonamide compounds to rabbits and studied the pharmacology of the blood by so-called phytopharmacologic methods—the effect on living plant protoplasm which is very sensitive to blood toxins—and it was surprising to find that after all these compounds the blood of these animals was less toxic than the normal blood of the same animals. Similar studies were made on the pharmacology of blood samples from patients receiving the various compounds and they also showed a lesser toxicity for living plant tissues than normal blood plasma. All this goes to show that after all sulfonamide drugs there are probably profound changes taking place in all the tissues and particularly in the fluid tissue, the blood, which ought to be watched in the course of chemotherapy in order to prevent dangerous accidents.

DR. HARRY J. CORPER, Denver: The sulfonamide drugs, especially promin, recently have attracted attention in tuberculosis the treatment of which of necessity is of long duration. We do not recognize the real value of sulfonamides as yet, but

10. Since this paper was submitted for publication we have observed 2 other patients in whom severe thrombopenia developed after the administration of moderate amounts of sulfathiazole, followed by death of both patients.

those who have worked on them enthusiastically and were encouraged in their action point out that there is a striking difference in the toxicity in animals and in man. This difference in toxicity is especially applicable to promin. I should like to ask Dr. Kracke whether he has observed such differences and whether he can explain it.

DR. ROY R. KRACKE, Emory University, Ga.: I am unable to give any definite answer to Dr. Corper's question. The most important thing to remember about the administration of sulfonamide drugs is the knowledge on the part of all people who administer such drugs that they are capable of producing the most serious and bizarre effects on the blood cells. Also that such effects can include a depression of the thrombocytes. The drugs, of course, should not be used indiscriminately. I have been concerned in seeing some of the surgeons literally spray the peritoneal cavity with whatever agent happens to be popular at the moment. We should all realize that high blood stream levels can occur from peritoneal absorption as well as intestinal absorption.

Clinical Notes, Suggestions and New Instruments

RECOVERY FROM EIGHT GRAMS OF BARBITURATES IN ATTEMPTED SUICIDE

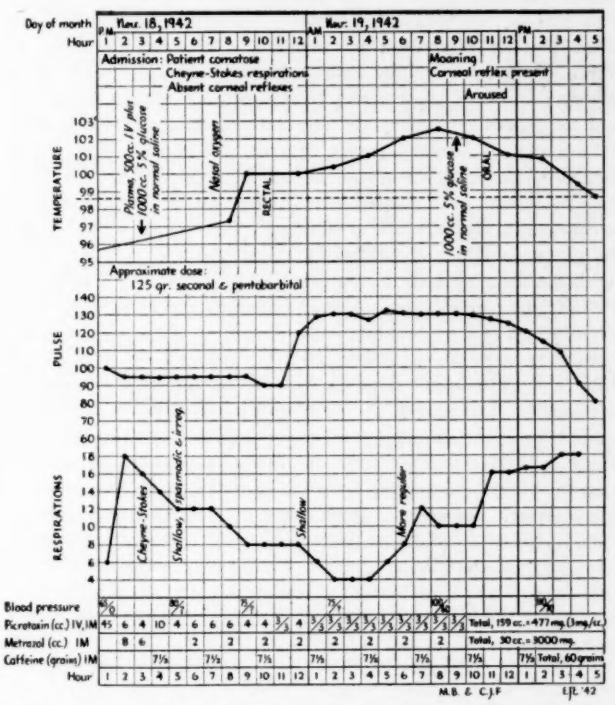
C. J. FRANCE, M.D.; MORTON BARNETT, M.D., AND F. F. YONKMAN, M.D., DETROIT

Barbital in its various forms has been responsible for numerous suicidal attempts, many of them successful. The unsuccessful cases can be attributed to either insufficient dosage ingested or to proper antagonistic therapy as is illustrated by the case reported here. In relation to the report of Hambourger [1] on the frequency of use of barbiturates as suicidal agents it behooves one to consider this class of drugs as chief offender in this modern age. Hambourger states (1939) that more than two million doses of barbiturates were sold daily in the United States and that from 1932 to 1936 the national incidence of suicide by means of barbiturates was 4.2 per cent of that for all poisons except gases; the incidence in large cities ranged from 2 to 16 per cent. These figures also behoove us to concern ourselves with the most satisfactory modern and accepted form of therapy in barbiturate poisoning.

The first clinical report of successful antagonism of phenobarbital overdosage by picrotoxin in a 3½ year old child is given by Arnett.[2] The rationale of his therapy was no doubt based on the experimental work in animals by Maloney, Fitch and Tatum,[3] who demonstrated the restorative actions of picrotoxin and other analeptics in the presence of poisonous doses of barbiturates. Combinations of analeptics such as picrotoxin and ephedrine,[2] picrotoxin and metrazol [4] or strychnine and ephedrine [5] may often be more desirable than a single agent. Arnett's patient recovered from 0.4 Gm. (6 grains) of amytal, Weiss's patient from 4.75 Gm. (71 grains) of phenobarbital and our patient from 8 Gm. (125 grains) of barbituric acid derivatives, two thirds of which was pentobarbital and one third seconal. According to Fantus [6] "the fatal dose is, in general, from fifteen to thirty times the therapeutic dose. The dose of barbital which is nearly always fatal is about 10 Gm., that of phenobarbital from 6 to 8 Gm. and that of dial about 2.4 Gm."

REPORT OF CASE

M. D., a white woman aged 32, was admitted in shock one hour after ingestion of 125 grains (8 Gm.) of a mixture of soluble pentobarbital and seconal. Respirations were only 8 per minute and of Cheyne-Stokes type. Blood pressure was 60/0 and there was complete areflexia. Twenty-five mg. of picrotoxin was cautiously injected throughout fifteen minutes on admission and 100 mg. was then slowly infused in 1,000 cc. of 5 per cent dextrose and saline solution intravenously. Shock was treated with intravenous plasma and other customary antishock therapy. At this point she was transferred to the ward. Inadvertently the stomach was not lavaged and there was no emesis at any time. In the ward picrotoxin in dosage of approximately 12 mg. was injected intravenously every half hour and 300 mg. of metrazol every three hours. In addition, 7½ grains (0.5 Gm.) of sodium with caffeine benzoate was injected intramuscularly every three hours. The patient received



This chart presents the important features of the clinical course of a patient who was severely poisoned with barbiturates. It indicates improvement of temperature, pulse, blood pressure, respiration and other signs after treatment with plasma, dextrose in isotonic solution of sodium chloride, oxygen, picrotoxin, metrazol and caffeine. Amounts of remedial agents used and time of their administration are also noted.

3,500 cc. of fluid intravenously within twenty hours. Her condition remained critical for the first eighteen hours; respirations dropped at one stage to 4 per minute, then gradually rose to 18-20 per minute. Blood pressure remained practically constant at 65-75/0, then slowly rose to normal within twenty hours, especially after the eighteenth hour. On the eighteenth hour corneal reflexes were noted and subsequently there was gradual return of all reflexes. She began to groan and was aroused at the twentieth hour, at which time all medication was withheld. There were no seizures or convulsions noted at any time, not even the slightest twitching. It was noted after each dose of picrotoxin that breathing increased in depth and frequency but only temporarily. A similar experience was encountered with metrazol, but favorable results, although appearing sooner, were less enduring than after picrotoxin. As the chart indicates, the patient improved steadily after the first eighteen to twenty hours but for the next twenty-four hours a toxic psychosis with confusion and delirium developed.

From the Department of Psychiatry of the Detroit Receiving Hospital and the Department of Pharmacology and Therapeutics, Wayne University College of Medicine.

1. Hambourger, W. E.: Study of Promiscuous Use of Barbiturates: Their Use in Suicides, J. A. M. A. **112:** 1340-1343 (April 8) 1939; II. Analysis of Hospital Data, ibid. **114:** 2015-2019 (May 18) 1940.
2. Arnett, J. H.: Ephedrine and Picrotoxin Used Successfully in Amytal Poisoning, J. A. M. A. **100:** 1593 (May 20) 1933.
3. Maloney, A. H.; Fitch, R. H., and Tatum, A. L.: Picrotoxin as Antidote in Acute Poisoning by Shorter Acting Barbiturates, J. Pharmacol. & Exper. Therap. **41:** 465-482 (April) 1931.
4. Koppanyi, Theodore; Linegar, C. R., and Dille, J. M.: Studies on Barbiturates, J. Pharmacol. & Exper. Therap. **58:** 119 (Oct.) 1936.
5. Weiss, Soma: Internat. Clin. **1:** 38 (March) 1936. Goodman, Louis, and Gilman, Alfred: The Pharmacological Basis of Therapeutics, New York, Macmillan Company, 1941, p. 143.
6. Fantus, Bernard: The Therapy of Barbiturate Poisoning, J. A. M. A. **115:** 527 (Aug. 17) 1940.

Gradually the confusion and delirium subsided, however, and she was transferred forty-eight hours later to another hospital in good mental and physical condition.

X-ray examination had revealed no pulmonary complications, and no kidney or liver damage was noted at any time. Urinalysis was repeatedly negative. On admission to the hospital the patient's temperature was 96.4 F. It rose to 102.4 rectally at the time of reaction and steadily dropped to normal; the pulse followed a similar course, reaching the highest point of 130 at the time of reaction and gradually returning to normal.

COMMENT

We believe this case to be of considerable interest chiefly because it demonstrates the value of immediate and persistent combined specific therapy. Caffeine with sodium benzoate no doubt was of value here, but adequate fluid balance with plasma and repeated sustained injections of picrotoxin and metrazol should receive the most credit for recovery. Numerous cases are available which indicate that the latter two agents have restored barbiturized patients without the use of caffeine with sodium benzoate; hence the latter drug need not be used in this type of case because its action is similar to but less intensive than that of picrotoxin or metrazol. Pharmacologically, all three of these analeptics stimulate the respiratory and circulatory regulatory mechanisms of the medulla oblongata but also act as general stimulants of the entire central nervous system. The action of metrazol is the first to become evident, but it is not as enduring or as sustained as that of picrotoxin. Therein lies the virtue of a combination of the two drugs in successful treatment of barbiturate poisoning. The drugs should either be given together or preferably intermittently, one alternating with the other at appropriate intervals. Frequency of injections is determined by signs of improvement, such as increase in respiratory rate or volume, improvement in pulse and pressure, return of corneal and pupillary reflexes and skeletal muscle tone and twitchings. One can nicely titrate, if persistent and meticulous, the speed of intravenous infusion of picrotoxin and metrazol by the signs enumerated. As improvement maintains or accelerates, infusion is lessened so as to obviate the danger of central nervous system stimulation to the point of convulsions. Should the latter supervene, intravenous barbiturate in finely fractionated doses is of value. Constant observation of the patient, however, precludes the probability of increased hyperexcitability to undesirable degrees.

SUMMARY

A woman aged 32 had ingested 8 Gm. of barbiturates and recovered after a total dose of 0.477 Gm. of picrotoxin and 3 Gm. of metrazol. Caffeine with sodium benzoate and plasma with 5 per cent dextrose and saline solution were also administered.

For successful treatment of barbiturate poisoning the following points should be strictly followed:

1. Immediate antagonistic treatment with adequate and safe initial doses of picrotoxin and metrazol, dosage to depend on the condition of the patient and the amount of barbiturate ingested, if known.

2. Immediate hospitalization with prompt antishock therapy, including plasma, dextrose, saline solution, an indwelling catheter, warmth and bed stilts, and any other agent or technic which might assist in the defeat of shock and promote excretion.

3. Copious, high enemas and early gastric lavage followed by 10 to 15 Gm. of sodium sulfate solution left in the stomach for catharsis. The sodium sulfate is preferred to the depressing magnesium ion in this condition.

4. Constant observation with appropriate, sustaining and alternating doses of picrotoxin and metrazol, dosage again depending on the condition of the patient.

High estimated or known dosage of barbiturates ingested need not discourage heroic treatment, since this case represents the upper limit of the average fatal dose stated by Fantus; but treatment must be immediate and multiple although suitable and sustained. Constant observation until recovery is mandatory.

TRANSPORTATION OF HUMAN SPERMATOZOA BY AIRPLANE FOR ARTIFICIAL INSEMINATION

FRANCES I. SEYMOUR, M.D.; ALFRED KOERNER, M.D., NEW YORK; DAVID COSTOM, M.D., MONTREAL

We report the first case of pregnancy resulting from artificial insemination in man using spermatozoa transported by airplane 500 miles. The child has proved to be a bright, normal healthy youngster.

The patient's husband gave an essentially negative history. The couple had been childless over a ten year marital period. A semen examination by the attending physician showed azoospermia. The physician then recommended cross artificial insemination as a last recourse.

Physical examination of the husband, which included a blood count, serologic test and urine studies were found to be negative. Investigation of a fresh coital seminal specimen, as well as a testicular puncture, substantiated the original diagnosis of azoospermia.

The wife's history was negative as to familial hereditary diseases. Examination, including blood studies, evaluation of gonadotropic substance, urine examination and uterosalpingography, proved essentially negative by the criteria at our disposal. The patient was accepted as a suitable case for cross artificial insemination.

In cases for cross artificial insemination it is essential to establish the husband's absolute sterility. Adjustment to the child produced by cross artificial insemination would be greatly jeopardized if a second child entered the family group resulting from a mistaken diagnosis of absolute sterility on the husband's part.

The examination of both husband and wife having been completed, the consent forms for artificial insemination which we have previously described [1] were signed and duly notarized.

Analysis of the findings corroborated the verdict of the reporting physician that the sterility of the couple was due to the husband's azoospermia. Artificial insemination with the aid of a donor was thus the only solution.

The responsibility [2] of selecting suitable donors is a great one. Not only must the donor's semen be normal and the donor free from venereal disease but he must have a good family history free from inheritable diseases or tendencies to disease. Furthermore, the physician must select as a donor a man whose eyes and hair have the same color as the husband's, and there should be some other common physical characteristics of the donor and husband. It would be most inadvisable to select a donor who is short and dark if the recipient's husband is tall and blond.

The selection [3] of a donor entails the impersonal procurement by the physician of semen from a healthy fertile male of good character and favorable heredity—one without evidence, clinical and serologic, of ever having had either gonorrhea or syphilis. The donor must, moreover, be unknown to the couple. The donors selected should be married men whose wives begat children by them.[4] This acts as a clinical check of fertility.

After deliberate consideration we selected a donor whose personal history was negative, whose family tree was free of

1. Seymour, Frances I., and Koerner, Alfred: Medicolegal Aspect of Artificial Insemination, J. A. M. A. **107:** 1531-1534 (Nov. 7) 1936.
2. De Lee, J. B., and Greenhill, J. B.: Year Book of Obstetrics and Gynecology, 1941, editorial discussion of Seymour and Koerner's article on Artificial Insemination: Present Status in the United States as Shown in a Recent Survey, p. 361.
3. De Lee and Greenhill: Year Book, 1941, discussion on S. Leon Israel's Scope of Artificial Impregnation in the Barren Marriage, p. 359.
4. Seymour, Frances I.: Sterile Motile Spermatozoa, Proved by Clinical Experimentation, J. A. M. A. **112:** 1817-1819 (May 6) 1939.

taint of hereditary disease or dyscrasia, who personally, as well as the members of whose ancestral tree, had a good educational background and a record of accomplishment in life, and who matched the husband physically. He was married and had children. On physical examination he was found free of any and all pathologic conditions. His wife knew and consented to his participation.

On April 11 we began the cross artificial inseminations. This was the eighth day of the patient's cycle. Inseminations were repeated on alternate days on six consecutive occasions. The patient returned to Canada and ten days later menstruated irregularly and scantily. Her physician made an Aschheim-Zondek test, which was negative.

The patient, in spite of being told not to expect results immediately (the first time or so), became bitterly "disappointed and depressed." In addition to being depressed (as all these patients are with the recurrence of each menstrual period) she could not afford another trip to New York, so we agreed to ship the specimens to Montreal, Canada. Her physician agreed to perform the inseminations, as he was aware of the fact that we had been shipping specimens of semen by plane for some time.

A new donor was chosen at this point because the viability index of the original donor's specimen was too short for the long Montreal trip. The second donor was matched in the same meticulous manner as the first had been.

On January 27, 29 and 30 three specimens were shipped by airplane via the regular New York to Montreal route. These specimens were unsuccessful in producing pregnancy.

The flight route between New York and Montreal via the Colonial Airlines, Inc., is at a level of 8,000 feet. Usually packages are placed in the baggage compartments situated in the wings of the plane, which are unheated and where the temperature maintained is the same as outside the plane. The weather for our next attempt was freezing. We therefore had to take the precaution that the specimen be carried in one of the moderately heated compartments of the airplane.

All specimens are placed in glass bottles embedded in cotton (acting as a cushion) and then put into a cardboard container. This in turn is sealed with regular commercial paper tape (gummed) to prevent opening in transit.

Through the courtesy and cooperation of the Canadian Customs Department, the local postmaster general waived all examinations of the parcels shipped by us to Dr. C. This of itself was very unusual, as the customs division of the Canadian government insists on chemical analysis of all fluids or products entering Canada.

February 24 we shipped a specimen which again leaked out. February 26 the successful specimen was shipped. We ship small quantities of fluid. This shipment contained 0.5 cc. of fluid. Dr. C. retrieved 0.2 cc. in a tuberculin syringe and inseminated intracervically. Examination showed the sperm to be very active, much more so than any of the previous specimens. On April 1 both Aschheim-Zondek and Friedman tests were positive. After an uneventful nine month gestation period a baby boy was born whose blond hair and physiognomy becomes more like the patient's husband daily. This child is over 2 years of age now.

CONCLUSIONS

1. Long range transportation of human spermatozoa by airplane can effect pregnancy.

2. Although pregnancy occurred from a single insemination on the twelfth day of the patient's cycle, persistence is a virtue which should not be forgotten when immediate success is not obtained.

3. Small amounts of semen—as little as 0.2 cc.—are effective in producing pregnancy.

53 East Ninety-Sixth Street.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

AUSTIN E. SMITH, M.D., Secretary.

OVARIES (See New and Nonofficial Remedies, 1942, p. 373).

The following dosage forms have been accepted:

JOHN WYETH & BROTHER, INC., PHILADELPHIA.

Ampoule Solution of Estrogens (in oil): 1 cc. and 5 cc. Each cubic centimeter contains the equivalent of 5,000 international units of estrone and 0.5 per cent phenol as a preservative, in corn oil.

Ampoule Solution of Estrogens (in oil): 1 cc. and 5 cc. Each cubic centimeter contains the equivalent of 10,000 international units of estrone and 0.5 per cent phenol as a preservative, in corn oil.

Ampoule Solution of Estrogens (in oil): 1 cc. and 5 cc. Each cubic centimeter contains the equivalent of 20,000 international units of estrone and 0.5 per cent phenol as a preservative, in corn oil.

NICOTINIC ACID AMIDE (See New and Nonofficial Remedies, 1942, p. 562).

The following dosage forms have been accepted:

ABBOTT LABORATORIES, NORTH CHICAGO, ILL.

Nicotinamide *(Powder)*: bulk.

Sterile Ampoules Solution Nicotinamide, 100 mg. per cc.: 2 cc.

Tablets Nicotinamide: 50 mg. and 100 mg.

WALKER VITAMIN PRODUCTS, INC., MOUNT VERNON, N. Y.

Tablets Nicotinamide: 20 mg., 50 mg. and 100 mg.

PROCAINE HYDROCHLORIDE (See New and Nonofficial Remedies, 1942, p. 56).

The following dosage forms have been accepted:

GEORGE A. BREON & COMPANY, INC., KANSAS CITY, MO.

Ampul Procaine Hydrochloride Solution 1%: 2 cc. Each cubic centimeter contains 0.01 Gm. in physiological solution of sodium chloride.

Ampul Procaine Hydrochloride Solution 2%: 2 cc. Each cubic centimeter contains 0.02 Gm. in physiological solution of sodium chloride.

PHENOBARBITAL SODIUM (See New and Nonofficial Remedies, 1942, p. 470).

The following dosage form has been accepted:

ENDO PRODUCTS, INC., RICHMOND HILL, N. Y.

Sodium Phenobarbital Solution in Propylene Glycol: 0.325 Gm. (5 grains) in 2 cc. ampules.

LIPIODOL, 40% IODINE (See New and Nonofficial Remedies, 1942, p. 306).

The following dosage form has been accepted:

E. FOUGERA & COMPANY, NEW YORK.

Lipiodol, 40% Iodine: 20 cc. neoprene-capped flask.

NICOTINIC ACID-U. S. P. (See New and Nonofficial Remedies, 1942, p. 561).

The following dosage form has been accepted:

PITMAN-MOORE COMPANY, INDIANAPOLIS.

Tablets Nicotinic Acid: 20 mg. and 50 mg.

NICOTINIC ACID AMIDE (See New and Nonofficial Remedies, 1942, p. 562).

The following dosage form has been accepted:

FLINT, EATON & CO., DECATUR, ILL.

Sterile Solution Nicotinamide, 50 mg. per cc.: 15 cc. rubber capped vial.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, MAY 15, 1943

GRAVE DIPHTHERIA

During the past fourteen years there have been repeated references in the medical literature to peculiarly severe outbreaks of diphtheria, most of them located in various districts of Europe. A recent review of this subject by McLeod [1] indicates not only that there are numerous records of unusually severe diphtheria but also that the results of serum treatment in many of the outbreaks proved singularly disappointing in spite of the great advance in the potency of antitoxic serums. The contrast in effectiveness of serum treatment between the incidence and severity of diphtheria in North America and in many parts of Europe, especially central Europe, has been particularly striking. Does this difference depend, McLeod asks, entirely on the more enthusiastic adoption of prophylactic inoculation in the New World? How far do questions of nutrition play a part? Are there complex and insufficiently understood aspects of the development of mass immunity independent of artificial prophylaxis? Finally, are different varieties of diphtheria bacillus endued with different epidemic potentialities involved?

There seems to have been an unwillingness to accept the most probable explanation, namely that the diphtheria in one place is different from the diphtheria in another and that it may change in the same place over a period of years. Although serum is highly valuable in the over-all picture, there may exist a variety of diphtheria in which its effect is disappointing. Some of the experiences, notably those in Australia, seem to show that with certain varieties of diphtheria in certain persons it will always be impossible to give serum in time to be of use—that is, as long as we are limited to the forms of antiserum now available. There are two other aspects of diphtheria as it has appeared in Europe in the last ten years which reflect a change from the diphtheria at the beginning of the century. These are a shift of the main incidence to school children from those of the age group 1 to 5 years and a definite diminution of laryngeal diphtheria.

The explanation for most of the observed facts is now established and depends on the existence of three well defined cultural types of diphtheria bacillus for which the designation gravis, intermedius and mitis have been suggested. A small percentage of strains do not correspond closely to any of these types. These atypical strains are significant only if they appear with sufficient frequency and are found to be definitely associated with serious clinical diphtheria. Their relative proportions vary from place to place and are highest where the diphtheria is mild or of moderate severity. They are commonly found among carriers and convalescents and are more rare in association with severe or fatal illness. They have not been observed to develop an epidemic tendency. The mitis strains are ordinarily associated with mild diphtheria, and when they cause death, they do so mostly in infants because of obstructive phenomena and pneumonic complications The intermedius strains are close to the gravis strains in the severity of the clinical conditions which they produce, although the over-all associated case death rate is less than with gravis infections. Furthermore the intermedius strains disappear more rapidly in convalescence and do not have the same tendency to epidemic spread as gravis infections. Clinically severe intermedius and gravis diphtheria are characterized by essentially toxic and hemorrhagic phenomena, myocardial weakness and pareses. The gravis strains possess a greater and more constant pathogenicity for animals, a deeper penetration of tissues in the human body and a greater epidemic potency.

It now seems probable that the numerous severe outbreaks of diphtheria described in Europe in 1927-1937 which were specially intractable to serum therapy were due to the gravis type of diphtheria bacillus. Likewise the similar serious epidemics in Britain and Australia appear to have been predominantly due to the gravis or intermedius strains. Consequently the question whether the brilliant results of prophylactic inoculation recorded in North America owe their superiority to those obtained in Europe to more comprehensive adoption and better execution or to the absence of gravis diphtheria in the former areas remains to be determined. Although the value of prophylactic and therapeutic inoculation has been proved beyond dispute, the present state of knowledge concerning the control of diphtheria is not conducive to any state of complacency in this country.

1. McLeod, J. W.: The Types Mitis, Intermedius and Gravis of Corynebacterium Diphtheriae, Bact. Rev. **7**: 1 (March) 1943.

REFRIGERATION ANESTHESIA IN MAJOR AMPUTATIONS

Not long ago the newly recognized importance of cooling the body in shock was discussed in these columns.[1] Refrigeration in conjunction with bloodlessness as an anesthetic in major amputations represents another application of crymotherapy. The fundamental work in the introduction of this form of anesthesia was done by Frederick M. Allen and his collaborators in the City Hospital of New York and experiments to extend the application are being continued in New York Medical College.[2] The basic principles and the main results so far of the new method were reviewed by Allen and Crossman [3] at the American Congress of Physical Therapy in Pittsburgh last December.

For some time it has been known that tissues can be kept alive for many days at ice box temperature provided they are not frozen. In experiments Allen has demonstrated that the cooling of limbs and other parts with ice water or ice, cracked or pulverized, down to near the freezing point, say 5 C. (40 F.), is harmless. There is a temporary suspension of life, with resumption of cellular activity as the temperature returns to normal. In refrigeration of limbs for anesthetic purposes, complete stoppage of the circulation is effected by careful application of the tourniquet. Such, in brief, is refrigeration anesthesia, which becomes complete after refrigeration for one to two hours. Needless to say, freezing must be avoided.

A human limb can be kept bloodless and anesthetic below the tourniquet for at least eight hours and the indications are much longer, even up to forty-eight hours, without injury while the rest of the body remains warm. Amputation is done without pain, loss of blood or strength and also without shock. The nerves in the cooled, bloodless tissues cannot transmit painful impulses or harmful reactions. Toxic products are not absorbed from the refrigerated limb, and infection or its extension is prevented. Refrigeration anesthesia provides for a bloodless and shockless amputation, apparently without interfering with the healing of the stump, which can be cooled as desired by gradual removal of the refrigeration. Proper cooling will restrain the circulation in the stump, prevent edema and obviate pain. So far, the reports of the results of major amputations by this method have been uniformly favorable. The mortality in amputation above the knee in diabetic gangrene has been reduced by the method.[4]

Refrigeration anesthesia undoubtedly is destined to increasing use under civilian conditions as well as in war. In trauma of the limbs, for instance, which is common in war, refrigeration anesthesia will be of special service, not only in amputation, but also in the control of hemorrhage, pain, progressive shock and infection during transportation of the patient when adequate treatment cannot be applied on the spot. The methods of refrigeration anesthesia are being standardized. In the New York City Hospital a controllable electric refrigeration apparatus is in use; light equipment has been devised for connection with the engine of motor vehicles, and the problems of the tourniquet are receiving attention. Obviously the field of refrigeration anesthesia, besides the great variety of injuries, will include also the vascular diseases that endanger the life of limbs. Refrigeration anesthesia is an important advance in treatment. For the sake of its great practical significance the work under way in this field should be pushed ahead and the clinical application of the method expanded. Among the developments under immediate trial are refrigeration as an anesthetic for skin grafting [5] and for the treatment of frost bite.

1. Cooling in Shock, editorial, J. A. M. A. **121:** 432 (Feb. 6) 1943; Environmental Temperature and Mortality in Burns, ibid. **121:** 1352 (April 24) 1943.
2. Allen, F. M.: Experiments on Pelvic and Abdominal Refrigeration with Special Reference to Traumatic and Military Surgery. Am. J. Surg. **55:**451 (March) 1942.
3. Allen, Frederick M., and Crossman, L. W.: Suggested Uses of Refrigeration Anesthesia Including War Surgery, Arch. Phys. Therapy **23:** 711 (Dec.) 1942. (See also Handbook on Amputations, American Medical Association, 1943, p. 15.)
4. Crossman, L. W.; Ruggiero, W. F.; Hurley, Vincent, and Allen, F. M. Reduced Temperatures in Surgery: II. Amputations for Peripheral Vascular Disease, Arch. Surg. **44:** 139 (Jan.) 1942.
5. Mock, H. E., Jr.: Refrigeration Anesthesia in Skin Grafting. Bull. Am. Coll. Surg. **28:** 56, 1943.

STERILIZATION OF THE AIR OF CLOSED SPACES

The circumstances of modern warfare frequently necessitate the herding together of large numbers of people in air raid shelters. The control of air borne infections in confined areas has therefore become a particularly urgent problem. Several studies of this problem have been previously noted in THE JOURNAL.[1] A necessary preliminary to the scientific study of a problem of this nature is the establishment of experimental methods by which the various factors involved can be satisfactorily varied and controlled. For this purpose Edward, Elford and the late Sir Patrick Laidlaw [2] have described a method for the experimental investigation of aerosol systems formed by the atomization of suspensions of viruses into the atmosphere. They have performed observations on the physical properties of such systems and found an experimental approach to certain practical problems connected with air borne virus infections. Thus they found that mice placed in an atmosphere into which the respective virus had been atomized contract the diseases of influenza and infectious ectromelia in a manner closely analogous to naturally occurring air borne infection. This method of infection, the authors believe, may be used with

1. Fumigation and Humidity, editorial, J. A. M. A. **120:** 625 (Oct. 24) 1942. Control of Air Borne Infection, ibid. **121:** 261 (Jan. 23) 1943.
2. Edward, D. G. ff.; Elford, W. J., and Laidlaw, P. P.: Studies on Air Borne Virus Infections: I. Experimental Technic and Preliminary Observations on Influenza and Infectious Ectromelia, J. Hyg. **43:** 1 (Jan.) 1943.

advantage in studying lesions of the lung microscopically and in obtaining more uniform infection of large batches of mice.

In additional work also from the National Institute for Medical Research in London, Edward, Lush and Bourdillon [3] describe quantitative studies carried out early in 1940 on the killing effect of ultraviolet radiation on aerosols of three different viruses: influenza A, vaccinia and herpes simplex. Using the experimental methods now established as reliable for observations of this kind, these workers showed that rapid and effective sterilization of atmospheres containing atomized particles of influenza and vaccinia viruses, and probably also of herpes simplex virus, can be obtained by ultraviolet radiation of wavelength 2,537 angstroms. These results support the work of Wells and his associates [4] and indicate that "germicidal" lamps are likely to be useful in reducing the infectivity of air contaminated with particles from persons suffering from virus infections of the respiratory tract.

An additional recent contribution to the subject by Challinor [5] of the University of Edinburgh is concerned solely with the action of hypochlorite on the total bacterial content of the air of an occupied closed room under fixed conditions of ventilation. He obtained a substantial reduction in the bacterial content of the air of an empty room infected with Bacillus prodigiosus (or with Staphylococcus albus or a diphtheroid bacillus) by means of hypochlorites introduced into the air by atomization or by spraying from an insecticide gun. The relative humidity of the air has been shown to be a factor of great importance in the effectiveness of air disinfection. In Challinor's experiments likewise effective air disinfection was not obtained at low relative humidities at temperatures ranging from 54 to 74 F. More accurate determination of the critical lower limit of relative humidity is desirable. Ultraviolet irradiation, propylene glycol vapor, as reported by Robertson and his colleagues,[6] and now hypochlorite solution all appear to exert bactericidal and bacteriostatic effects on the atmosphere of closed air spaces. The experimental methods for controlling the factors involved are now available, so that it remains only to choose what method or combination of methods can be most effectively employed in actual practice. Possibly the bactericidal agent may have to be varied, depending on special circumstances such as the time of year or the degree of humidity in the area. Nevertheless a partial solution at least to the problem of controlling the spread of infectious diseases in closed spaces is now at hand.

3. Edward, D. G. ff.; Lush, Dora, and Bourdillon, R. B.: Studies on Air Borne Virus Infections: II. The Killing of Virus Aerosols by Ultraviolet Radiation, J. Hyg. **43**: 11 (Jan.) 1943.

4. Wells, W. F., and Brown, H. W.: Recovery of Influenza Virus Suspended in Air and Its Destruction by Ultraviolet Radiation, Am. J. Hyg. **24**: 407 (Sept.) 1936. Wells, W. F., and Henle, Werner: Experimental Air Borne Disease: Quantitative Inoculation by Inhalation of Influenza Virus, Proc. Soc. Exper. Biol. & Med. **48**: 298 (Oct.) 1941.

5. Challinor, S. W.: Bacteriologic Observations on the Air of Occupied Premises: I. Air Disinfection with Hypochlorites: A Simple Practical Method of Disinfecting the Air of Occupied Premises, J. Hyg. **43**: 16 (Jan.) 1943.

6. Robertson, O. H.; Loosli, C. G.; Puck, T. T.; Bigg, Edward, and Miller, B. F.: The Protection of Mice Against Infection with Air Borne Influenza Virus by Means of Propylene Glycol Vapor, Science **94**: 612 (Dec. 26) 1941. Robertson, O. H.; Bigg, Edward; Puck, T. T., and Miller, B. F.: The Bactericidal Action of Propylene Glycol Vapor on Micro-Organisms Suspended in Air, J. Exper. Med. **75**: 593 (June) 1942.

THE CONSCIENTIOUS OBJECTOR

The term conscientious objector came into use in the first world war, although reference to the problem appears in Gibbon's "Decline and Fall of the Roman Empire." The Mennonites were exempted from military service in the Netherlands in 1575. In the United States, members of some religious denominations were exempted from general military service during the Civil War. At the commencement of the first world war there were in the United States, according to Hoag,[1] about 300,000 males classified as conscientious objectors. About 30 per cent of these were of military age. In June 1918 the Surgeon General's Office sent out to various camps a special form for examination of conscientious objectors. May,[2] in his report to the Office of the Surgeon General, presented the then available information concerning the intelligence, education, grounds of objection and social and political history of conscientious objectors. The report covered twenty camps and represented about 1,000 objectors. May pointed out that the intelligence of the conscientious objectors, as measured by the Army mental tests, was on the average, above that of the white draft of the Army as a whole. At least 97 per cent of the men had sufficient intelligence to know what they were doing. About 50 per cent were Mennonites; less than 10 per cent of these went beyond the eighth grade. The 12 per cent of the total series who reached college were either Socialists, Dunkards or Friends. The various religious sects involved, with the possible exception of the Friends, believe in the literal interpretation of the Scriptures. The grounds of objection were, in general, three: religious, social and political. The religious objector makes his appeal to the Bible, church creed and to conscience, the social objector to individual freedom; the political objector usually bases his objection on the ground of alien citizenship.

Stalker [3] of Edinburgh reports the results of an examination of 12 persons with psychiatric states who were also conscientious objectors. They represented three types of personalities: the introverted-asocial group, the antisocial group and the mixed group. Two patients suffered from schizophrenia, 1 from a schizoid state and 1 from a mixed paranoid and manic state.

1. Hoag, D. E.: The Psychology of the Conscientious Objector, New York M. J. **111**: 187 (Jan. 31) 1920.

2. May, Mark A.: The Psychological Examination of Conscientious Objectors (Published with the Approval of the War Department), Am. J. Physiol. **31**: 152, 1920.

3. Stalker, Harry: Conscientious Objectors with Psychiatric States, J. Ment. Sc. **89**: 52 (Jan.) 1943.

There is thus a certain preponderance of schizophrenic types, as found by previous writers. The meager reports from continental European countries, whose laws do not provide for conscientious objectors, deal almost entirely with persons mentally involved. Thus, among 31 objectors studied by Schulthess[4] there was only 1 sane person; 15 were psychopaths, 4 of them feebleminded and 6 schizoid. Of his own psychotic patients all were schizophrenic except 1 with dementia paralytica.

Prompt discharge from the army and appropriate institutional treatment are the effective solution of the problem of the psychopathic objector. The problem of the sane objector is much more complicated. There is, of course, no intention on the part of our government to compel the genuinely conscientious religious objector to enter the armed services, for that would amount to violation of his constitutional rights, something we must guard against even in time of war. However, the degree of sincerity of his beliefs is difficult to determine. In the first world war, of 2,100 persons 1,500 were found to be sincere objectors and recommended for farm or industrial furloughs, 219 were found to be sincere objectors to combatant but insincere as to noncombatant service, 156 were found to be sincere objectors of combatant but willing to accept noncombatant service, 15 were found to be sincere objectors to combatant service but willing to work in reconstruction hospitals and 122 were found to be insincere as to both combatant and noncombatant service.

In this war many of our conscientious objectors are young men of good education, often of good family training. No doubt the same proportions prevail in relation to religious and political objectors as in previous wars. Fortunately the problem was given attention early by the Selective Service Administration, so that today many of these boys are engaged in occupations in the field of medicine, in hospitals and in similar activities, where they are rendering a genuine service to the war effort. A number have volunteered to serve as subjects for important experiments in testing the value of life saving technics in the services to be given to our troops in China and in the South Pacific. There are functions which the conscientious objectors can perform and for which many of them have already volunteered without demanding participation in combat.

Numerically the problem of the conscientious objector is of little importance. From an ethical point of view the problem is one of reeducation, of instilling in the individual the appreciation of his civic responsibilities and of awakening in him a feeling of national conscience and national unity.

4. Schulthess, Peter: Ueber Militärdienstverweigerung aus krankhafter Ursache, Schweiz. Arch. f. Neurol. u. Psychiat. **33**: 95 (heft fascicule 1) 1934.

Current Comment

BLOOD DONATIONS BY WAR WORKERS

Industrial concerns recently have been apprehensive about the effect of blood donations on war workers. A number of medical consultants to the Industrial Hygiene Foundation have concluded that ill effects need not be expected if standard procedure is followed closely. Although there may be some temporary lassitude on the part of indoor sedentary workers, eligible donors are not as a rule made weaker nor is there greater susceptibility to upper respiratory infections or other complications in the immediate period following the donation. It was the consensus that industry need not be concerned about the matter from the point of view of absenteeism or lowered production.

THE CASTORIA INCIDENT

In the week previous to April 27 the Centaur Company at Rahway, N. J., began to receive occasional reports that persons who had been given Castoria had responded with severe vomiting and nausea. The gradual accumulation of such reports led the representatives and chemists of the company, therefore, to test the product on themselves, with a result that four who tested the product also developed nausea and vomiting. Animals responded in a similar manner. The Food and Drug Administration was immediately informed and after consultation the decision was made to call in all of the product involved. Preliminary investigations failed to reveal any toxic substance or any break in the processes of manufacture. The only change in the formula has been a reduction in the sugar content as a result of the restrictions on sugar by the War Production Board. Once the decision was made to call in the product, three thousand telegrams were sent to all customers of record. Representatives of the entire Sterling Drug Products Company organization (more than two hundred in number) were instructed to call personally on all retailers and wholesalers with a view to having the product reclaimed. Radio stations throughout the nation and newspapers everywhere were requested to publish and give publicity to an announcement developed by the company. All together five hundred thousand telegrams were sent to obtain return of the product. At the time THE JOURNAL goes to press there seem to have been three deaths in which the physicians reporting the incidents feel that the toxicity of the product was responsible. Preliminary tests made in the laboratories of the Centaur Company and in several other laboratories which have been investigating the product failed to reveal any substance on which the responsibility can be placed. Innumerable theories have been offered including bacterial contamination, a toxin or a decomposition product of senna as the toxic substance, yet not one of these theories has as yet been substantiated by any acceptable evidence. Just as soon as any specific cause can be determined, announcement will be made.

THE LOCAL USE OF SULFATHIAZOLE IN THE NASOPHARYNX AND LARYNX

Fenton [1] and Freeman [2] report that the local use of sulfathiazole is highly beneficial in acute nasopharyngeal as well as laryngeal infections of streptococcic and staphylococcic nature. Fenton found that acute nasopharyngitis and laryngotracheitis due to streptococci yielded quickly to small quantities of finely powdered sulfathiazole blown into the nostrils, pharynx and larynx. He found also that gargling with a solution in a fourth of a cup of hot water of a 7 7/10 grain (0.5 Gm.) tablet of sulfathiazole often brings relief from local swelling and discomfort. He did not find that sulfathiazole had any beneficial effect on the ulcerations of Vincent's angina or the local lesions of tuberculosis or carcinoma of the larynx. Freeman found from well planned experiments that in the usual acute nasopharyngeal infections the free application of powdered sulfathiazole to the nasopharyngeal mucous membrane by means of a compressed air powder syringe quickly produced subjective and objective relief and shortened the course of the infection. The dose varied from 1 to 2 Gm. per treatment, which is inexpensive, easily carried out on ambulatory patients and, so far, apparently free from danger. These reports indicate that sulfathiazole may be a practically effective antibacterial agent in nasopharyngeal and probably in other similar infections. There seems to be need for a simple gargle with definite antibacterial powers for popular use. Fenton points out that rarely sensitivity to sulfathiazole may develop from its local use, an effect that needs further early and careful study. There seems to be no way by which the danger of sensitization can be determined in advance of the use of the drug.

MEDICAL RECRUITMENT FOR INDUSTRY IN INDIANA

Development and recruitment of medical personnel for industry has been a difficult problem. The physician who serves full time or nearly full time in plants engaged in the manufacture of war materials or which operate under priority ratings has been generally regarded as performing duties essential to the war effort. A dependable means of attracting new medical personnel into industrial practice has received serious consideration by the procurement agencies and by the Council on Industrial Health of the American Medical Association. An experiment is now in progress in Indiana which is intended to aid the solution of this problem. The plan calls for a preliminary two day conference at which both physician and employer may concurrently learn about objectives and procedure in modern industrial health service. Subsequently, opportunities for most intensive training will be made available to any physician who is attracted to this field or who is willing to volunteer for industrial work as his contribution to winning the war. The general details of both programs have been organized by the committee on industrial health of the Indiana State Medical Association with invaluable assistance from the Bureau of Industrial Hygiene of the State Health Department and the Indiana University School of Medicine. The two latter agencies will provide the intensive training, so arranged that very small groups can be accommodated for training to start at almost any time. Experience in Indiana already has demonstrated a better understanding of industrial health objectives and a most cooperative attitude among the principal agencies involved. The use of facilities at hand on a voluntary basis to meet an urgent situation merits a successful outcome in Indiana.

REGISTRATION UNDER THE HARRISON NARCOTIC ACT AND THE MARIHUANA TAX ACT

On or before July 1 every physician registered under the Harrison Narcotic Act or under the Marihuana Tax Act, or both, must, unless he is in service, reregister with the collector of internal revenue of each district in which he maintains an office or a place for the treatment of patients. Failure to reregister within the time allowed by law adds a penalty of 25 per cent to the annual tax payable at the time of registration and in addition makes the physician in default liable to a fine not exceeding $2,000 or to imprisonment for not exceeding five years or to both. In recent years the Commissioner of Internal Revenue has given some tardy registrants the choice between paying sums by way of compromise in lieu of the penalties for their offenses or, as an alternative, accepting criminal prosecution with resultant publicity and liability to fines and possible imprisonment. This was an act of grace on the part of the commissioner; he might have instituted criminal prosecutions without allowing the offending physicians any choice in the matter. If the course that the commissioner has adopted does not produce the desired promptness in registration, he will have no recourse other than criminal prosecution to attain that result. A physician in the armed forces need not reregister. Such a physician when he receives the application form for reregistration should return it to the office of the collector of internal revenue from which it was sent, together with a statement showing that he is in the armed forces, that he does not have in his possession any narcotics and requesting that the registration number previously assigned to him be reserved. The several offices of the collectors of internal revenue have or will notify each registrant in detail of the course he should follow if he is in service. A physician on entering service should return all unused order forms to the collector's office and should dispose of all narcotics on hand, either by returning them to the wholesale concern from which purchased, if the packages are in unbroken form, or by transferring the narcotics to another physician after having obtained permission for such transfer from the office of the collector of internal revenue.

1. Fenton, Ralph A.: Local Use of Sulfathiazole in Otolaryngologic Practice, Arch. Otolaryng. **37**: 491 (April) 1943.
2. Freeman, Marvin S.: Local Use of Sulfathiazole Powder for Acute Pharyngeal Infections, Arch. Otolaryng. **37**: 496 (April) 1943.

MEDICINE AND THE WAR

In this section of The Journal each week will appear official notices by the Committee on War Participation of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medicine and the war and such other information and announcements as will be useful to the medical profession.

PROCUREMENT AND ASSIGNMENT SERVICE FOR PHYSICIANS, DENTISTS AND VETERINARIANS

PROCURING PHYSICIANS, DENTISTS AND VETERINARIANS IN THE FIELD

The Director of the Field Operations Branch of the Officer Procurement Service, Army Service Forces, War Department, Washington, D. C., on May 1 issued the following memorandum, which supplements the basic instruction on this subject contained in FT-34, Feb. 27, 1943. See also FT-38, FT-40, FT-42, FT-45, FT-47 and FT-52.

Lag in the Surgeon General's Program

The War Department is concerned over the lag in obtaining the number of physicians and dentists required by the Surgeon General's program for 1943.

As previously stated in FT-34, this program called for appointments at the following monthly rates: physicians 575, dentists 400, veterinarians 75.

The Officer Procurement Service now has completed three months' processing operations under FT-34. The composite results of such operations (at April 22, 1943), contrasted with the three month requirement of the Surgeon General's program, have been as follows:

	Physicians	Dentists	Veterinarians	Total
1. Cases received by field offices from state P. & A. chairmen	2,975	3,121	328	6,424
2. Less cases closed through candidates' refusal, and so on	1,297	691	62	2,050
3. Net cases available for completion of processing	1,678	2,430	266	4,474
4. Cases on April 22 in process or suspense	872	1,003	75	2,050
5. Cases completely processed and sent forward to SGO	806	1,427	191	2,424
6. SGO program, 3 month appointment requirement	1,725	1,200	225	3,150

Of the cases completely processed and sent forward to the Surgeon General, a considerable percentage do not mature to the commissioned stage (physically disqualified, not recommended, refusal of grade, and so on). Accordingly, actual appointments of physicians during the three month period are seriously below the required level of 1,725 appointments and actual appointments of dentists are somewhat below the required level of 1,200 appointments. The veterinary appointments are to date adequate for current demands (see FT-52).

Change of Procedure in Processing of Physicians and Dentists

FT-34, paragraph 7, states the basic processing procedure in effect previous to this time. After receipt by a district office of an availability clearance form (form 97) in regard to a particular individual, the office requests the individual to complete all papers and take all steps required of him within fourteen days. If no reply is received from the individual or if he declines to act as requested, a report will be transmitted by the district office to the appropriate state Procurement and Assignment chairman. In other words, under the procedure heretofore authorized, no obligation to follow up an "available" candidate who is unwilling to cooperate is placed on the district office, which discharges its duty by promptly reporting the facts to the Procurement and Assignment Service.

With the approval of the Surgeon General and the War Manpower Commission, the following change of procedures in processing physicians and dentists has been authorized: Effective immediately, district offices are authorized to contact any individual whose "availability" clearance form has been received from a state Procurement and Assignment chairman in California, Connecticut, Massachusetts, New York or Wisconsin and to urge on him his duty as a citizen to take steps to qualify for a commission. Persuasion should be exercised in a dignified manner; but district offices receiving such "availability" clearance forms are expected to do a real selling job to convince "available" persons who are apparently suitable for appointment that it is their patriotic duty to apply for a commission, even though it may involve financial sacrifice. In many cases it will not involve a financial sacrifice if advantages from army pay from a tax standpoint are considered. It will be appropriate for district offices to enlist the assistance of qualified medical and dental professional societies in bringing to the person's attention his individual responsibility to his country in the existing war emergency. The Surgeon General's representatives in the service commands will be authorized to cooperate in presenting the subject to the individual. Every prompt and proper effort must be taken in the states enumerated to increase the number of physicians (and to a lesser extent dentists) to be processed and submitted to the Surgeon General under FT-34.

If, in spite of the efforts referred to, an "available" and apparently suitable individual is unwilling to proceed with the processing of his case or to make reply to the district office, the facts will be reported to the appropriate state Procurement and Assignment chairman as soon as such impossibility of processing is determined by the district office.

In other respects, the standard processing procedure outlined in FT-34, paragraph 7, as amended, is confirmed.

MEDICAL TRAINING PROGRAMS OF ARMY AND NAVY

Last week (p. 120) the details of the Army and Navy programs for training medical students were published in THE JOURNAL. Medical students who now hold commissions in the Medical Administrative Corps or in the Officers' Reserve Corps and who are on inactive service for the purpose of completing their professional training may remain in that status pending completion of internship if they choose to do so and provided they fulfil training requirements. In this event they will continue to pay all of their own expenses and will also receive instruction in medicomilitary subjects. They may, however, resign their commissions and enlist in the Enlisted Reserve Corps; they will then be called to active duty at the end of the current academic period. In the event that this choice is made, they become soldiers ordered to college. They have the privileges and responsibilities of enlisted men, including pay and allowances, hospital care and subordination to military discipline.

Medical students in good standing in approved schools who are not now under army jurisdiction, if inducted under Selective Service subsequent to June 30, 1943 (they may apply for voluntary enlistment and transfer to the Enlisted Reserve Corps prior to that time), may be assigned with the least practicable delay to the Army's specialized training unit at the institution which they have previously attended.

Premedical students in the Enlisted Reserve Corps are to be called to active duty and assigned for continuation of their preprofessional or professional training. Premedical students not in the Enlisted Reserve Corps if inducted under Selective

Service subsequent to the present academic period may be, if they attain a score of 115 or better on the Army General Classification Test, if practicable, assigned for the army specialized training program.

Medical officers will be assigned to army medical units in colleges holding army contracts in order to instruct trainees in medicomilitary subjects. Medical instruction for all groups will follow the standard curriculum in force in the medical school. Only those schools which can give the standard medical training in thirty-six months elapsed time will be considered for contract. This includes, of course, the so-called five year schools. The number of men desiring premedical and medical training will doubtless, as in civil life, exceed the number of vacancies, so that disappointments are inevitable.

The navy program differs little in regard to the choice offered medical and premedical students. The published program does not discuss students taken by Selective Service; it does state that a small percentage of premedical students will be taken by the Navy from the successful applicants who passed the test given on April 2, 1943 in high schools and colleges throughout the country or who pass subsequent similar tests. Although neither the Army nor the Navy makes any promises to complete these medical programs, it may be safely assumed that all students, whether in reserve or in active enlisted status, if their scholastic and military records remain satisfactory, will be allowed to complete their medical training through the intern year.

RELOCATIONS OF PHYSICIANS

Reports received by the War Manpower Commission's Procurement and Assignment Service for Physicians, Dentists and Veterinarians show that about 600 physicians have changed their places of residence and practice in the last few months, Chairman Paul V. McNutt announced, March 30. The Procurement and Assignment Service, a division of the Bureau of Placement, makes an effort to accomplish such relocations when the medical needs of the civilian population would be better served. Figures compiled by the Procurement and Assignment Service come from forty of the forty-eight states. Of a total of 587 relocations in these forty states, 340 were directly due to action by the Procurement and Assignment Service. Five of the relocated physicians are women. A total of 214 of the 582 relocated male physicians are either over 45 years of age or, if younger, disqualified for military service. There have also been relocations in Kentucky, Delaware, Louisiana, Minnesota, Virginia, West Virginia, Oklahoma and Vermont, but the figures as yet have not been reported. In many instances, the Procurement and Assignment Service reported, the assumption of increased duties by a decreased number of physicians remaining in an area has been seen as the best solution to a community's health problem. In a number of states ingenious medical care plans have been worked out locally which enable fewer physicians to care for more civilians. Among such states are Maryland, California, Oregon, Michigan and Arkansas.

ARMY

NEW BRIGADIER GENERALS

The President sent to the Senate, May 4, recommendations that sixty-three officers of the army be given temporary promotions and among those recommended to be brigadier generals were Col. George C. Beach Jr., M. C., originally from Topeka, Kan., and Col. Ralph H. Goldthwaite, M.D., originally of Boston.

GENERAL KING AWARDED MEDAL

Brig. Gen. Edgar King, M. C., U. S. Army, who was surgeon of the Hawaiian Department at the time of the Japanese raid on Pearl Harbor, has been awarded the Distinguished Service Medal for outstanding service in formulating plans for caring for the wounded in Hawaii. General King was responsible for preparing plans of the medical department in that area for operations in case of battle, and on Dec. 7, 1941 he carried out those plans with "such consummate skill as to save an unprecedented proportion of the wounded and elicit the admiration of the medical world." General King was born in Arkansas in 1884 and has served in the Medical Corps of the United States Army for the last thirty-six years.

JAPANESE PRISONERS

According to the Chicago *Tribune* the War Department informed his parents on April 27 that Capt. Max H. Bernstein, a former resident at Cook County Hospital, Chicago, is now a prisoner of the Japanese in the Philippine Islands. Captain Bernstein was commissioned in the army in January 1941 and went to the Philippine Islands in October of that year.

Relatives disclosed on April 13, according to the New York *Times*, that Capt. Harold W. Keschner and Capt. Samuel Bloom of Brooklyn, both members of the U. S. Army Medical Reserve Corps, are now prisoners of the Japanese. Both of these physicians interned at Mount Sinai Hospital, New York, where Captain Keschner's father is on the staff. Both of these young physicians served at Manila, Bataan and Corregidor.

THE FIVE THOUSANDTH GRADUATE

Graduating exercises were held on April 14 at the Medical Replacement Training Center, Camp Barkeley, Texas, for another class of the medical administrative corps officers candidate school, and in this large class a special honor was paid to John E. King of Detroit, who was the five thousandth graduate since the school's inception in May 1942. In this instance the diploma was personally awarded by Brig. Gen. Roy C. Heflebower, commandant of the school, who also delivered the commencement address. Others participating in the ceremony were Col. George E. Armstrong, assistant commandant of the school, and Lieut. Col. Charles H. Driscoll, M. A. C., executive officer, who administered the oath of office. Medical administrative corps officers are especially trained to carry on in the medical department the work of supply, personnel, hospital administration and training, positions which heretofore have been fulfilled by medical and dental corps officers, thus relieving the latter for duty with troops in various theaters of operation.

THE VALLEY FORGE GENERAL HOSPITAL

The Public Relations Officer of the Valley Forge General Hospital, Phoenixville, Pa., writes that through an error in his office the name of Capt. Victor H. Kugel was inadvertently omitted from the list of medical members of the staff of the hospital as published in THE JOURNAL, April 10, page 1224. Captain Kugel is the assistant chief of the general medical section. The Public Relations Officer also notes that Lieutenant Bregman's name was erroneously listed as Lieut. Gregman.

Since the article was published, the following additions to the staff have been made: Major Josiah T. Showalter, new chief of the neuropsychiatric section, vice Major Walter E. Barton, relieved; Capt. Edward R. Mountain to the eye, ear, nose and throat section, and 1st Lieut. Louis C. Burket to the outpatient department.

LIFE FOR THE WOUNDED

At a luncheon in Washington, D. C., May 18, the president of Reichel Laboratories of Kimberton, Pa., will present to the medical corps of the U. S. Army a painting entitled "Life for the Wounded," which depicts the administration of blood plasma by transfusion to a wounded soldier at the battle front. Reichel Laboratories has devised a plan whereby retail druggists may help the Red Cross increase its list of blood donors through a window display based on this painting. Every druggist using the display will receive a supply of folders explaining the routine of blood donation. Each customer is to be requested to telephone the local Red Cross blood donor service to make an appointment to give a pint of blood.

A HOSPITAL SHIP IN THE PACIFIC

The Bureau of Medicine and Surgery of the Navy has announced, according to the *Army and Navy Journal*, details concerning the care of some 4,039 patients on a hospital ship during an extended period beginning with the offensive in the Solomon Islands in August 1942. Many were injured at Guadalcanal, others in battle at sea and in the air. The report was made by Comdr. L. K. Ferguson and Lieut. Comdrs. R. B. Brown and J. T. Nicholson, all of Philadelphia, and Lieut. Comdr. H. E. Stedman of Ann Arbor, Mich., who remarked on the excellent condition of most of the patients taken aboard the hospital ship, especially those who had received treatment previously at field and base hospitals. The predominating injuries among the marines were wounds from fragments of shells and grenades, bullet and bayonet wounds and compound fractures. Sulfathiazole was sprayed into the simpler wounds and a pressure bandage of elastic webbing applied. The patient with a through and through wound of the leg was usually able to be up walking in four or five days from the time of the injury, and the wounds healed in a week or ten days. Not a case of infection developed in a patient treated in this manner and not 1 case of tetanus developed. All naval personnel are immunized against tetanus. About two thirds of the patients had received treatment at base and field hospitals ashore before being placed aboard the hospital ship. Of the entire group of patients treated, only 7 died, a mortality rate of 0.18 per cent.

Another report received by the Bureau of Medicine and Surgery was from Lieut. George Crile Jr. of Cleveland, M. C., U. S. Naval Reserve, concerning 366 patients treated at the naval mobile hospital at Auckland and evacuated there by the previously mentioned hospital ship a day or two after the hospital had been established. The only death in this group was of a man who suffered burns over most of his body. Dr. Crile said that the most striking feature of the casualties seen at this hospital was the rapidity with which the healthy young men recovered from trauma or disease, a phenomenon probably largely the result of the excellent medical care which was available to these patients from the moment of injury.

THE BROOKE GENERAL HOSPITAL

The Station Hospital at Fort Sam Houston, Texas, was named the Brooke General Hospital in honor of the late Brig. Gen. Roger Brooke of the Medical Corps on Sept. 2, 1942. The hospital, located on the large military reservation of Fort Sam Houston, consists of the old and new station hospitals with expansion units in battalion barracks located near the new station hospital building.

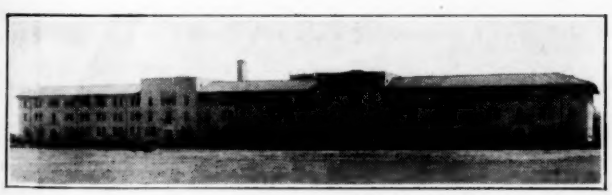
The construction of the buildings varies in type, but all buildings that house patients are of permanent construction. This hospital receives most of its patients from the various military posts in southwestern Texas and also acts as a station hospital for the post of Fort Sam Houston.

The commanding officer is Col. George C. Beach, medical corps, with the following medical officers on duty in key positions:

Lieut. Col. Emmett M. Smith, executive officer.
Major Clyde Kernek, hospital inspector and training officer.
Major Robert J. Jaehne, registrar.
Capt. George M. Hilliard, receiving and disposition officer.
Col. Warren C. Fargo, assistant commandant, medical department, enlisted technicians school.
Col. John C. Woodland, chief of the medical service.
Col. John C. Burch, chief of the surgical service.
Col. Alfred R. Thomas Jr., chief of the laboratory service.
Lieut. Col. Lee K. Emenhiser, chief of the eye, ear, nose and throat service.
Lieut. Col. Glenn D. Carlson, chief of the x-ray service.
Major James B. Snow, chief of the pediatrics section.
Lieut. Col. Philip E. Haynes, chief of the outpatient service.
Major Fred R. Sloan, chief of the gastrointestinal section.

New hospital.

New neuropsychiatric building.



Annex number 2.

Two cars of three car hospital train.

Since before the first world war it has been one of the largest and most active hospitals operated by the Medical Department of the Army. It receives and treats all classes of medical and surgical cases, is designated as a pathologic center for the southern part of the United States, and operates a training school for enlisted medical technicians. For six months the hospital has been operating a training school for physical therapy aides and on the 1st of July will open a school for dietitians. The hospital is also one of the few army hospitals designated for the training of interns, and a class of twelve will complete their training on June 30.

The Brooke General Hospital has a capacity of 2,225 beds at present, and considerable expansion can be rapidly accomplished by taking over for hospital purposes some of the modern battalion barracks located nearby.

Major Mordecai M. McDowell, chief of the general medical section.
Lieut. Col. James B. Polka, chief of the neuropsychiatric section.
Major Edward V. Swift, chief of the cardiorenal vascular section.
Major James B. Snow, chief of the pediatrics section.
Capt. Drury S. Blair, chief of the dermatologic section.
Capt. John T. Richards, chief of the infectious and contagious section.
Capt. Robert K. Myers, chief of the tuberculosis section.
Major William D. Tigertt, chief of the pathology section.
Major Vincent D. Vermooten, chief of the urologic section.
Lieut. Col. Percy M. Girard, chief of the orthopedic section.
Capt. Robert C. L. Robertson, chief of the neurosurgical section.
Major William A. Millington, chief of the plastic surgical section.
Capt. Frank P. Coleman, chief of the thoracic surgical section.
Major Herbert C. Fisher, chief of the general surgical section.
Major Thomas E. Smith, chief of the rectal surgical section.
Lieut. Col. John W. Winter, chief of anesthesiology.
Major James M. Siever, chief of the obstetric section.
Major Aubrey S. McGee, ward surgeon, officers' medical wards.
Major Dale J. Austin, ward surgeon, officers' surgical wards.
Major Samuel Millman, ward surgeon, women's medical wards.
Lieut. Col. Robert G. Swearingen, ward surgeon, women's surgical wards.

NAVY

THE LOWEST NAVY VENEREAL DISEASE RATE

The U. S. Navy annual venereal disease admission rate per thousand for 1942 was 29 per cent lower than for the previous year and was, it is said, the lowest in naval history. The Division of Preventive Medicine of the Bureau of Medicine and Surgery reports that the 1942 rate per thousand for the entire navy was 36; in 1941 it was 51 and in 1940 it was 80. For the continental United States the navy venereal disease admission rate last year was 22, in 1941 it was 29 and in 1940 it was 40.

The section of venereal disease control in the Division of Preventive Medicine reports that the two venereal disease posters "Fight Syphilis and Gonorrhea" and "Easy to Get—Syphilis and Gonorrhea" have proved so effective that a second and larger edition has been published.

TOUR OF INSPECTION BY ADMIRAL McINTIRE

A tour of inspection of numerous naval activities was recently completed by Rear Admiral Ross T. McIntire, Surgeon General of the Navy. The Surgeon General was of the opinion that special commendation should go to the Naval Hospital at Corpus Christi, Texas, "one of the smartest of our newer hospitals," for the excellent indocrination course it is giving to the Waves.

The medical department of the Parris Island Station is complimented on the handling of cases of neurosis in that it is finding gainful occupation for them on the station farm and the percentage of recoveries is said to be more than 70. The Bureau of Medicine and Surgery *Weekly Gazette* of May 3 states that the commanding officer of this station paid a high compliment to the service for the fine way the dentists were putting the recruits in order.

NAVY CONVALESCENT HOSPITALS

According to the Bureau of Medicine and Surgery *Weekly Gazette* of April 19, the U. S. Navy is considering the acquisition of the resort hotel at Sun Valley, Idaho, and of the Hotel Awahnee in Yosemite National Park, Calif., to be used as convalescent hospitals.

INSTRUCTION IN THE SPECIALTIES

A class of eight medical officers have been nominated for duty under instruction of internal medicine at the Naval Hospital, Philadelphia, and six medical officers have been assigned to the Mayo Clinic, Rochester, Minn., for advanced instruction in general and reconstructive surgery.

COMMANDER HOGAN AWARDED MEDAL

The Secretary of the Navy, Frank Knox, presented to Comdr. B. W. Hogan (MC) U.S.N., the Navy and Martine Corps Medal on April 15 for outstanding heroism in treating injured survivors of the U. S. S. *Wasp*, even though severely burned and injured himself.

NEW BUILDINGS FOR NAVAL MEDICAL SUPPLY DEPOT

The Naval Medical Supply Depot, Brooklyn, has acquired new buildings and property at Edgewater, N. J., which will be known as the annex of the Brooklyn depot. It has an area of 29 acres and buildings which will provide 234,600 square feet of storage space with ample rail facilities, power plant and garage. When the present construction is completed the total storage space will be approximately 600,000 square feet.

MISCELLANEOUS

OFFICE OF DEFENSE HEALTH AND WELFARE SERVICES ABOLISHED

The President, by Executive Order 9338, dated April 29, has abolished the Office of Defense Health and Welfare Services and has transferred to the Federal Security Agency the functions, duties, powers, personnel, property, records and funds of that office and of the Health and Medical Committee and the other advisory committees and subcommittees appointed by the director of that office. The transferred functions, duties and powers will be hereafter administered under the direction and supervision of the Federal Security Administrator through an office to be established by him and to be known as the Office of Community War Services or through such other agency, officers and persons in the Federal Security Agency as he shall designate and in such manner as he shall direct.

WARNING—SUBSTITUTES FOR GLYCERIN

The present shortage of glycerin and the necessity of issuing available supplies for essential war needs has made it necessary to deny the use of glycerin in many instances. Many former users of glycerin who are now unable to secure supplies are using substitute materials when they are available.

In a recent memorandum the United States Department of Agriculture discussed the reasons for its inability to allocate glycerin to all uses as well as the methods for obtaining glycerin for approved end uses. The need of working out substitutes when possible also was mentioned. In using substitutes all consumers must investigate the toxicity of the substitute, since certain substitutes are definitely toxic. Among these toxic substitutes are ethylene glycol, diethylene glycol (diglycol), carbitol and polyethylene glycol, and under no circumstance should these or other toxic substitutes be used in any product whether food, drug or cosmetic which is likely to be taken internally or otherwise absorbed by external application.

The Department of Agriculture points out that a number of proprietary glycerin substitutes have been offered for sale. Before they are used, inquiry should be made of the manufacturer in order to determine whether or not any of the compounds mentioned or other toxic substitutes are present. When in doubt as to the use of any of these substitutes in food, drug or cosmetic preparations, one should inquire of the authorities in charge of administering the Food, Drug and Cosmetic Law.

USE OF COPPER IN RUBBER HOSPITAL SUNDRIES

Use of copper in hot water bottles, syringes, ice caps, bulbs and similar supplies commonly referred to as "rubber hospital sundries" is restricted, but not completely prohibited, by the terms of Copper Order F-9-c, the Copper Division of the War Production Board pointed out on April 22. In brief, these are the applicable rules governing the use of copper and copper base alloy in such products: If the copper material was acquired before June 30, 1942 it may be used in manufacturing, assembling or finishing rubber hospital sundries only on orders rated AA-4 or higher. However, a manufacturer may apply to WPB on Form PD-426 for authorization to fill lower rated orders. If the copper material was acquired after June 30, it may be used in the manufacture of the hot water bottles and other utensils without a preference rating, subject to the following conditions: The copper material may not be used where the use of a less scarce material is practicable, and the use of more copper material, or copper of a higher grade, than is necessary for the proper operation of the article to be manufactured is prohibited.

ORGANIZATION SECTION

OFFICIAL NOTES

DOCTORS AT WAR

Radio broadcasts of Doctors at War by the American Medical Association in cooperation with the National Broadcasting Company and the Medical Department of the United States Army and the United States Navy are on the air each Saturday at 5 p. m. Eastern War Time (4 p. m. Central War Time, 3 p. m. Mountain War Time, 2 p. m. Pacific War Time). An exception is the Chicago area, where the broadcasts are heard by transcription at 10:30 p. m. Saturdays over Station WMAQ.

The titles and guest speakers for the next four programs are as follows:

May 22. "Flash Burns."
Speaker, Rear Admiral Ross T. McIntire, M. C., Surgeon General, United States Navy.
May 29. "Sick Call."
Speaker, Brig. Gen. John M. Willis, Commanding General, Camp Grant, Illinois.
June 5. "Doctors for Tomorrow."
Speaker, Brig. Gen. Fred W. Rankin, President of the American Medical Association.
June 12. "Medical Discoveries in Wartime."
Speaker, Morris Fishbein, M.D., Editor of THE JOURNAL.

BEFORE THE DOCTOR COMES

The American Medical Association program on Radio Station WLS (890 kilocycles) entitled "Before the Doctor Comes" will be on the air every Thursday afternoon at 2:45 up to and including May 27. Mrs. June Merrill will interview Dr. W. W. Bauer, Director, Bureau of Health Education, on common home health problems. The titles for the last two programs are:

May 20. "Nervous Habits."
May 27. "Immunization."

WOMAN'S AUXILIARY

WOMAN'S AUXILIARY TO THE AMERICAN MEDICAL ASSOCIATION

Twenty-First Annual Meeting, June 7-9, 1943
Drake Hotel, Chicago

A most cordial invitation is extended to all Auxiliary members and the wives of physicians attending the American Medical Association meeting to attend the sessions of the twenty-first Annual Meeting of the Woman's Auxiliary to the American Medical Association. Mrs. Rollo K. Packard is chairman of the Chicago Committee.

Headquarters will be in the Grand Ballroom of the Drake Hotel, where all meetings will be held. Please register early and obtain your badge and program. Tickets may be purchased at the registration desk.

All meetings will convene at the time scheduled. Please be prompt.

Registration, in the French Room Foyer:

Sunday, 2 to 4 p. m.
Monday, 8:30 a. m. to 4 p. m.
Tuesday, 8:30 a. m. to 4 p. m.

Preconvention Meetings

SUNDAY, JUNE 6

3 p. m. Nominating Committee meeting, Parlor H (east mezzanine), chairman Mrs. Robert E. Fitzgerald.

7 p. m. Finance Committee meeting, chairman Mrs. Harold F. Wahlquist.

PROGRAM

MONDAY, JUNE 7

9 a. m. Meeting of the Board of Directors, Parlors F-G (east mezzanine), Mrs. Frank N. Haggard presiding.

12:30 p. m. Luncheon in honor of the past presidents of the Woman's Auxiliary to the American Medical Association, Gold Coast Room. Tickets $2.25 (subject to market conditions and food administration regulations). Guest speaker Dr. Frank P. Hammond, chairman of the Advisory Committee of the Woman's Auxiliary to the Illinois State Medical Society. Subject Doctors' Wives—Medicine's Closest Ally.

Convention Meetings

MONDAY, JUNE 7

2 p. m. Opening meeting of the House of Delegates of the Woman's Auxiliary to the American Medical Association, Grand Ballroom (lobby floor east), Mrs. Frank N. Haggard, President.

Invocation. Rev. Harrison Ray Anderson, Fourth Presbyterian Church, Chicago.
Address of Welcome. Hon. Edward J. Kelly, mayor of Chicago.
Tribute to Deceased Members.
Introduction of Mrs. Rollo K. Packard, chairman of the Chicago Committee.
Presentation of the President-Elect, Mrs. Eben J. Carey.
Minutes of the Twentieth Annual Meeting. Mrs. Carlton F. Potter, Secretary.
Roll Call. Mrs. Carlton F. Potter.
Convention Rules of Order. Mrs. Silas S. Smith.
Credentials and Registration. Mrs. Arthur I. Edison.
President's Message. Mrs. Frank N. Haggard.

Reports of Officers:

Recording Secretary, Mrs. Carlton F. Potter.
Corresponding Secretary, Mrs. Scott C. Applewhite.
Treasurer, Mrs. David W. Thomas.
Auditor, to be read by the recording secretary.

Reports of Directors:

Mrs. R. E. Mosiman.
Mrs. James P. Simonds.
Mrs. John Baron Farley.
Mrs. W. K. West.
Mrs. Frank L. Davis.
Mrs. David B. Allman.
Mrs. William J. Butler.

TUESDAY, JUNE 8

9 a. m. General session of the Woman's Auxiliary to the American Medical Association, Grand Ballroom, Mrs. Frank N. Haggard presiding.

Minutes. Mrs. Carlton F. Potter.

Announcements.
Credentials and Registration. Mrs. Arthur I. Edison.
Resolutions. Mrs. James P. Simonds.
Reports of Chairmen of Standing Committees:

Finance, Mrs. Harold F. Wahlquist.
Hygeia, Mrs. George R. Dillinger.
Legislation, Mrs. Luther H. Kice.
Organization, Mrs. T. Mitchell Burns.
Press and Publicity, Mrs. George H. Ewell.
Program, Mrs. William Hibbitts.
Public Relations, Mrs. Frank P. Dwyer.
Revisions, Mrs. Eustace A. Allen.

Report of Historian. Mrs. John J. Ryan.

Report of Bulletin Circulation and Central Office. Miss Margaret Wolfe.

Reports of state presidents.

12:30 p. m. Luncheon in honor of Mrs. Frank N. Haggard, President, Gold Coast Room. Tickets $2.25 (subject to market conditions and food administration regulations).

Guest Speakers: Brig. Gen. Fred Rankin, President, American Medical Association; Dr. James E. Paullin, President-Elect, American Medical Association; Dr. Morris Fishbein, Editor, THE JOURNAL and HYGEIA.

2 p. m. Afternoon session:

Report of Nominating Committee. Mrs. Robert E. Fitzgerald.

Election of Officers.

Installation of Officers and Presentation of President's Pin. Mrs. R. E. Mosiman.

Inaugural Address. Mrs. Eben J. Carey.

Minutes. Mrs. Carlton F. Potter.

8 p. m. Opening Meeting of the House of Delegates of the American Medical Association, Palmer House, Grand Ballroom. Members of the Woman's Auxiliary and guests are welcome.

WEDNESDAY, JUNE 9

10 a. m. Executive Committee Meeting, Parlors F-G. Mrs. Eben J. Carey, presiding.

10:30 a. m. Board of Directors Meeting, Parlors F-G. Mrs. Eben J. Carey, presiding.

Dr. James P. Simonds, professor of pathology, Northwestern University Medical School, will speak on "The Effect of War on Medicine."

MEDICAL LEGISLATION

MEDICAL BILLS IN CONGRESS

Changes in Status.—Public hearings have been started by the Senate Committee on Education and Labor and by the House Committee on Interstate and Foreign Commerce, respectively, on S. 983 and H. R. 2326, companion bills to provide training for nurses for the armed forces, government and civilian hospitals, health agencies and war industries through grants to institutions. S. 875 has been reported to the Senate by the Senate Committee on Education and Labor, a bill to provide for the preparation of high school students for wartime service, to be known as the Victory Corps Act of 1943. A federal appropriation of $912,513 for the fiscal year 1943 and of $8,484,377 for each fiscal year thereafter is proposed for making payments to states which have submitted plans approved by the Commissioner of Education. Among other things, a state plan must make available appropriate medical examinations of students who may be inducted into the armed forces or who may be preparing for other essential war services. A total of $3,009,300, it is contemplated, will be allotted annually for medical examinations. The authorizations contained in the bill will expire six months after the end of the war. S. 885 has passed the Senate, a bill to establish a Civilian Supply Administration. The administrator of that administration, it is proposed, will be authorized, among other things, to ascertain the quantities and types of goods and services (including but not limited to food, clothing, shelter, fuel, transportation and medical care) necessary to keep the civilian population healthy and functioning effectively and to apply to the appropriate government agencies which allot resources for military, naval, export and civilian purposes for the amounts and types of manpower, materials, facilities, transportation and other resources determined by him to be essential to produce and distribute the necessary goods and services. H. R. 2536 has been reported to the House by the House Committee on Education, a bill to enact the Vocational Rehabilitation Act. This legislation will be administered, it is proposed, by the Federal Security Agency. Among other things, it provides that the federal government will pay one half of necessary expenditures for designated rehabilitation services rendered under state plans to disabled individuals found to require financial assistance, including corrective surgery or therapeutic treatment necessary to correct or substantially modify a physical condition which is static and constitutes a substantial handicap to employment, necessary hospitalization, in no case to exceed ninety days, in connection with corrective surgery or therapeutic treatment, medical examination where necessary to determine eligibility for vocational rehabilitation, and such prosthetic devices as are essential to obtaining or retaining employment.

Bills Introduced.—S. 1033, introduced by Senator Clark, Missouri, and H. R. 2554, introduced by Representative Van Zandt, Pennsylvania, provide that all the provisions of existing law and of veterans' regulations applicable to veterans of World War I be extended to include veterans of the present war and their dependents.

STATE MEDICAL LEGISLATION

California

Bill Introduced.—A. 1928, to amend the health and safety code, proposes to eliminate therefrom the existing proviso that a drug shall be deemed to be misbranded if it is sold at retail for use by man and contains any quantity of amidopyrine, cinchophen, sulfanilamide or any of its preparations, compounds or derivatives, unless it is sold on a written prescription signed by a member of the medical, dental or veterinary profession who is licensed by law to administer such drug and its label bears the name and place of business of the seller, the serial number and date of such prescription, and the name of such member of the medical, dental or veterinary profession.

Bills Enacted.—S. 547 has become chapter 214 of the Laws of 1943. To amend the premarital examination law, it provides that certificate forms furnished by other states having comparable laws and by the United States Army or Navy for military personnel may be accepted. A. 6 has become chapter 254 of the Laws of 1943. It amends the osteopathic practice act by eliminating the existing requirement that osteopaths, at the time of the annual renewal of their licenses, must present satisfactory evidence of the completion, during the preceding year, of a minimum of thirty hours of professional educational work as approved by the osteopathic board. A. 1936 has become chapter 325 of the Laws of 1943. It amends the penal code by making it unlawful for any person to sell, furnish or give away any veronal, barbital (acid diethylbarbituric) or other barbituric acid derivative and compounds thereof, except on the order or prescription of a physician and surgeon, dentist, chiropodist or veterinary surgeon duly licensed to practice in the state of California. Such prescription shall not be refilled without the order of the prescriber except that a prescription for phenobarbital or any preparation, mixture or compound of phenobarbital may be refilled.

Connecticut

Bill Enacted.—H. 1265 has become chapter 166 of the Laws of 1943. It makes both husband and wife liable for the reasonable and necessary services of a physician and for hospital expenses rendered to the husband or wife or a minor child living with the parents.

Illinois

Bills Introduced.—S. 376 proposes the granting annually of cash awards of $500 and $250 to physicians in the employ of the department of public welfare other than those employed in the Illinois Neuro Psychiatric Institute and the Institute for Juvenile Research, for the purpose of stimulating creative research in the field of mental illness, its nature, causes and treatment. The awarding of these prizes would be under the direction of, and according to rules established by, the department of public welfare. H. 512, to amend the law relating to premarital examinations, proposes that the required certificate may be executed by any duly licensed physician, rather than just by a duly licensed physician in this state as is presently required.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

State Medical Election.—Dr. Frederick W. Wilkerson, Montgomery, was elected president of the Medical Association of the State of Alabama at its recent annual meeting. Other officers chosen include Drs. Benjamin W. McNease, Fayette, and William Hill McCaslan, Union Springs, vice presidents. Dr. Douglas L. Cannon, Montgomery, continues in office as secretary-treasurer, his term not expiring until 1945. The 1944 meeting of the association will be held in Montgomery, April 18-20.

CALIFORNIA

Case of Spotted Fever in Siskiyou County.—The first case of Rocky Mountain spotted fever in Siskiyou County was reported April 1. Newspapers stated that a woman residing in Horse Creek contracted the disease and was dismissed as improved from the Siskiyou County General Hospital, Yreka, after thirty-seven days.

New Hospital in Vallejo.—Ground was broken on April 5 for the Vallejo Community Hospital, a 262 bed institution to be erected in one hundred and eighty days by the Emergency Operations Unit of the Public Buildings Administration of the Federal Works Agency at a cost of $1,100,000. All buildings will be of wood construction because other materials are not available, but each wing will be cut off from the corridors by fire walls. Construction will be one story because elevators are not available.

Autopsy Surgeon Needed.—Applications are being accepted by the Los Angeles County Civil Service Commission for the position of autopsy surgeon for work in the Los Angeles County Department of Coroner. The salary is $4,800 a year. There will be no written examination; candidates will be rated on their professional training and experience and their ability and personal suitability for the work as evidenced by investigation or interview. Applicants must be between 21 and 55 years of age with an M.D. degree from an approved medical school and have completed at least one year's internship in an approved hospital and two years of professional experience in the pathology laboratory of an accredited hospital, medical school or commercial laboratory or in a public agency. Applicants over 55 years of age may file for "duration" work. Applications must be filed on or before May 24 in the office of the civil service commission, room 102, Hall of Records, Los Angeles.

FLORIDA

State Medical Election.—Dr. John R. Boling, Tampa, was named president-elect of the Florida Medical Association at its annual meeting in Jacksonville, April 16, and Dr. Eugene G. Peek, Ocala, was installed as president. Other officers include Drs. Louie M. Limbaugh, Jacksonville, Lloyd J. Netto, West Palm Beach, and Carl E. Dunaway, Miami, vice presidents. Dr. Shaler A. Richardson, Jacksonville, was reelected secretary-treasurer for the nineteenth year. Stewart G. Thompson, D.P.H., Jacksonville, was confirmed to his post as managing director, which he has held for eighteen years.

MARYLAND

Study of Absenteeism.—The labor-management advisory committee in Baltimore has just begun an absenteeism program which will provide specific information about job absences at each plant. A separate record will be kept for each worker, the data to be made available to the worker's selective service board.

Personal.—Dr. Joseph Earle Moore, Baltimore, was given an honorary life membership in the American Social Hygiene Association recently.——Dr. Robert U. Patterson, dean of the University of Maryland School of Medicine and College of Physicians and Surgeons and superintendent of the University Hospital, Baltimore, has been appointed consultant to the Baltimore City Health Department.

Night Health Service.—To meet the health problem created by the rapid growth of population, the Baltimore Department of Health has expanded its baby clinics, venereal disease clinics and tuberculosis clinics and has rearranged hours so that they are open nights to serve war workers. In addition, its staff of inspectors has been increased and is campaigning vigorously against insanitary housing. According to the Office of War Information the city's health problems have been increased because of the large percentage of persons now coming to Baltimore from more isolated rural areas in North Carolina, West Virginia, Kentucky and Tennessee who lack the knowledge of and interest in health protection that most urban residents possess. At the end of 1941 toxoid inoculation against diphtheria had been given to 81 per cent of the children under 5 in Baltimore and to 94 per cent of those between 5 and 9. This percentage, which has been rising steadily for years, is now decreasing because of the newcomers, it was stated.

MASSACHUSETTS

Dr. Wilinsky Awarded Civic Medal.—Dr. Charles F. Wilinsky, executive director and superintendent of the Beth Israel Hospital, Boston, on April 12 was awarded the annual medal of the Boston City Club for distinguished civic service. Dr. Wilinsky is chief medical officer of the Boston Public Safety Committee and his selection for the medal was "the outcome of his work in organizing the medical section of the city's civilian defense effort, and for his work during the Cocoanut Grove disaster." The gold medal is presented each year to the citizen adjudged by the club to have rendered the most outstanding civic service to greater Boston. Editorial comment was made in all the local papers concerning the presentation.

Changes in Program of Dental Medicine.—Certain changes have been announced in the dental program at Harvard University now being carried forward by the new school of dental medicine, including the reduction of the course from five years, as set in 1940, to four academic years, or three calendar years under the accelerated wartime schedule; award of the D.M.D. degree only on completion of the course, and the permission of students successfully completing the course for the D.M.D. to register subsequently in the medical school and qualify for the M.D. degree on the completion of one and a half additional academic years or one additional calendar year in the medical school. According to an official release there will continue to be no segregation of candidates for the D.M.D. degree from the candidates for the M.D. during the first two academic years. Students in the school of dental medicine will be required to meet the same standards of scholarship that are demanded of medical students, and the successful completion of the courses in the first two academic years of the medical school curriculum will be necessary before the candidate for the degree D.M.D. can enter the third year in the school of dental medicine. During the first two years discussions in the field of dentistry will be presented to the combined class so that students planning to enter this field will be able to orient themselves for the third and fourth sessions. When the activities of the Harvard School of Dental Medicine were launched with funds of $1,350,000 in July 1940 the plan provided for a five year course, at the end of which the successful student should be given both the M.D. and the D.M.D. degree. In an official statement James B. Conant, president of the university, stated that it was predicted from the start that difficulty would be encountered under the plan because a man enrolled for the joint degrees of M.D. and D.M.D. might shift his interest to some other branch of medicine rather than continue with the course headed for D.M.D. "The prediction of difficulty was accurate. Whether or not this would have been the case except for the war, no one can tell. Instead of the course of five academic years which we planned, army and navy regulations now make mandatory the limitation to three calendar years in courses leading to the medical and dental degrees," President Conant said.

MINNESOTA

State Tuberculosis Unit.—The establishment of a tuberculosis control unit in the state division of public institutions has been announced. Dr. Herbert A. Burns, medical superintendent of the Minnesota State Sanatorium at Ah-gwah-ching, has been placed in charge of the new unit. He has been succeeded at Ah-gwah-ching by Dr. Francis F. Callahan, formerly medical director of Pokegama Sanatorium, Pokegama.

Sentenced for Fraudulently Obtaining Morphine Prescriptions.—On April 21 Alva George, 43 years of age, was found guilty by a jury in the District Court of Hennepin County of obtaining morphine prescriptions by fraud and sen-

tenced not to exceed two years in the Women's Reformatory at Shakopee. The investigation preceding her arrest disclosed that the defendant was obtaining morphine prescriptions simultaneously from seven physicians. At the trial, and prior to sentence being imposed, counsel for the defendant severely criticized the medical profession, claiming that the defendant was given narcotic prescriptions without any reason.

NEW YORK

Institute for Family and Child Care Services.—Vassar College, Poughkeepsie, will conduct its second institute for family and child care services in wartime, July 1-30. The institute constitutes a training and demonstration center for parents, teachers, social workers and other professional workers. Community organizations, child care, out of school programs, personality development and preparation for service in China will constitute the five main fields of study for the institute.

New York City

The Harvey Lecture.—Dr. Virgil P. W. Sydenstricker, professor of medicine, University of Georgia School of Medicine, Augusta, will deliver the eighth and last Harvey Society Lecture of the current series at the New York Academy of Medicine on May 20. His subject will be "Nutrition Under Wartime Conditions."

Physician Fugitive from Prison Term.—Dr. Louis G. Small, who is said to be under a Sing Sing sentence of three to six years on his General Sessions conviction for operating an abortion mill with two other physicians, is the subject of a countrywide search ordered on April 19 by District Attorney Frank S. Hogan, the New York *Times* reported. Dr. Small was to have appeared before Judge Jacob Gould Schurman Jr. on April 19 for a new commitment to Sing Sing on the sentence after having lost an appeal in the Appellate Division. The *Times* reported that the casualty company which had furnished $12,000 bail for him, pending the outcome of the appeal, had received word from Dr. Small from Eastman, Ga., that he would not return and the court issued a bench warrant for him. The *Times* further reported that after he had been found guilty of nine counts of abortion and one of conspiracy in the operation of an abortion mill at 116 East Sixty-Third Street Dr. Small obtained a writ of reasonable doubt from Justice Samuel Null in the Supreme Court. The bail was accepted for him at the time. The appellate division handed down the decision affirming the conviction, April 16, it was stated.

Answer Criticisms on Alien Admissions to Membership.—"The committee on membership, the comitia minora, and the society itself can exclude candidates for membership only on the grounds of individual disqualification" the Medical Society of the County of New York stated April 24 in reply to "certain" criticisms made on the admission of a large number of foreign physicians to membership in the society. According to the New York *Times*, the comitia minora said that "they have no power, nor have they the desire, to discriminate against an individual candidate because of race, creed, color or national origin." It was emphasized that "all races and all nations have contributed to medical progress and that in organized medicine, at least, the profession remains a fraternity from which no deserving practitioner, whatever his origin, is barred. On practical grounds alone the comitia minora long ago recognized the desirability of bringing qualified foreign graduates into the society, thereby subjecting them to the same ethical restraints as govern native physicians. This is assuredly preferable to leaving large, unassimilated professional groups outside the jurisdiction of organized medicine," the report stated.

Fund for New Science Fellowships.—Charles L. Mayer has given funds to the Committee on Medical Education of the New York Academy of Medicine to provide four fellowships of $2,000 each for research with a view to advancement of knowledge in the following subjects:

The use of choline and other lipotropic factors in the prevention and treatment of fatty infiltration of the liver and hepatic insufficiency.
The action of ingested choline, lecithin, methionine and inositol on precancerous lesions and disorders associated with neoplastic disease.
The effects of riboflavin, certain amino acids, and casein on the development and growth of cancer.
Study of the relationship between precancerous lesions of the mouth, hepatic insufficiency and gastrointestinal disorders.

Applications for consideration in these awards should state the name of the individual who will conduct the research, the name of the laboratory or institution in which the work will be conducted and the special qualification, interest or attributes of the investigator and institution which may justify the award. If the applicant has already conducted research in the specified field for which the award is sought, this fact should be stated and reprints of publications in this work by the author should accompany the application together with any other facts or information deemed pertinent. An approval of the director of the laboratory should accompany the application, if the application is not made by the director. All applications should be sent in triplicate to Dr. Mahlon Ashford, secretary of the committee, not later than October 30.

OHIO

Centenary of Western Reserve Medical School.—Western Reserve University School of Medicine, Cleveland, will observe the one hundredth anniversary of its founding, October 27, with a special program consisting of Drs. George H. Whipple, Rochester, N. Y., on "Blood Plasma Proteins: Their Production, Function, Substitution and Replacement"; Alan Gregg, New York, "The Matrix of Medicine," and Reginald Fitz, Boston, "The Crimson Thread."

Physician Honored by General Assembly.—Dr. Errett Le Fever, Glouster, member of the house of representatives, was honored by the Ohio General Assembly on March 9, which had been proclaimed "Le Fever Day." The House unanimously adopted House Joint Resolution number 28, proposing to honor Dr. Le Fever on his twenty-first year of service in the legislature. The resolution states that Dr. Le Fever is the only man in the history of the general assembly to have served for twenty-one years. He first represented Athens County in the house of representatives in 1900-1901. He has since held the same position in 1904-1905, 1921-1922, 1933-1934, 1939-1940, 1941-1942 and the current session, 1943-1944. He was also a member of the state senate during the years 1923 to 1930, representing the Ninth-Fourteenth districts. Dr. Le Fever graduated at the Medical College of Ohio, Cincinnati, in 1890.

OREGON

Personal.—Dr. Donald J. Bourg, The Dalles, recently health officer of Wasco and Sherman counties, has been named to a similar position in Benton and Polk counties with offices in Corvallis.——Dr. Claude C. Chick has been named health officer of Hood River.

Sommer Memorial Lectures.—Ernest Carroll Faust, Ph.D., professor of parasitology and head of the department of tropical medicine, Tulane University of Louisiana School of Medicine, New Orleans, will deliver the third in a series of Ernst A. Sommer Memorial Lectures, May 17-22, at the University of Oregon Medical School, Portland, on the following subjects:

Horizons of American Tropical Medicine, May 17.
Insects and Their Allies as Causative Agents and Transmitters of Disease, May 18.
Malaria, May 19.
Yellow Fever and Dengue, May 20.
Amebiasis and Related Infections of the Bowel, May 21.
Filariasis, May 22.

New Dean at Oregon Medical School.—Dr. David W. E. Baird Jr., acting dean, has been appointed dean of the University of Oregon Medical School, Portland, to succeed Dr. Richard B. Dillehunt, who resigned. Dr. Baird was born in Baker, Oct. 21, 1898. He graduated at the medical school in 1926. He was named assistant clinical professor in medicine in 1932 and in 1935 was named medical director of hospitals and clinics. He was appointed associate dean in 1938. Dr. Dillehunt, who graduated at Rush Medical College in 1910, has been associated with the Oregon faculty since 1912, first as professor of anatomy and assistant dean and later as clinical professor of orthopedic surgery and head of the department. He had been dean since 1920.

PENNSYLVANIA

License Revoked.—The state board of medical education and licensure on March 26 revoked the license to practice medicine in Pennsylvania of Dr. John Herriott Boyd, Beavertown. The action was taken on evidence that Dr. Boyd was addicted to the use of narcotic drugs and alcohol to such an extent as to make him unfit for the practice of medicine, the board reported.

War Conference for Civilian Physicians.—A combined meeting of the sixth and seventh councilor districts of the state medical society in Williamsport, May 14, constituted a war conference for civilian physicians. Among the speakers were Drs. Robert L. Anderson, Pittsburgh, on "Civilian Medical Practice in Wartime"; Walter F. Donaldson, Pittsburgh, "War Participation and Organized Medicine," and Herbert T. Kelly, Philadelphia, "The Modern Science of Nutrition and Nutritional Deficiency." A feature of the meeting was the

presentation of fifty year testimonial certificates to Drs. William J. Campbell, Mount Union; Isaac G. Headings, McAlisterville; Ella N. Ritter, Williamsport; Henry D. Hart, Genesee, and Nathan W. Church, Ulysses.

Philadelphia

Fifty Year Citations Awarded.—At the ninety-first annual commencement of the Woman's Medical College of Pennsylvania, March 11, citations were awarded to the following fifty year graduates: Drs. Jessie W. Fisher, Middletown, Conn.; Charlotte E. Goodman, Mount Pleasant, Pa.; Katharine S. Munhall, Buffalo; Ella N. Ritter, Williamsport, Pa.; Martha P. Sanborn, Kingston, N. H.; Rhuy Wilson-Swan, Nankin, Ohio; Emma P. Weeks Metzger, Riverside, N. J.; Rachelle S. Yarros, La Jolla, Calif.; Ella M. Anderson, M. F. McKirachan-Lyons and Maria C. Walsh.

SOUTH CAROLINA

State Medical Election.—Dr. William R. Wallace, Chester, was chosen president-elect of the South Carolina Medical Association at the annual meeting of the house of delegates recently and Dr. William Atmar Smith, Charleston, was inducted into the presidency. Dr. Arthur P. McElroy, Union, was elected vice president and Dr. Julian P. Price, Florence, was reelected secretary-treasurer.

WASHINGTON

Resigns as State Medical Adviser. — Dr. William E. Steele, Olympia, has resigned as chief medical adviser to the state department of labor and industries to engage in private practice in Seattle. Dr. Steele, who held the state position for seven years, will be named consultant to the department in the Seattle area, newspapers reported April 8.

WEST VIRGINIA

Physicians Needed.—The Merit System Council of West Virginia announces unassembled examinations for positions in the state health department and state department of public assistance. Applications will be accepted continuously, but new registers will be established from applicants that file no later than June 26. Positions for which applications are being accepted, and their respective salary ranges, are listed herewith. Appointments may be made at above the minimum salaries.

Director of maternal and child hygiene	$4,200-$4,800
Assistant director, maternal and child hygiene	3,840- 4,500
Director, industrial hygiene	4,200- 4,800
Director, vital statistics	4,200- 4,800
Director, communicable diseases	4,200- 4,800
Assistant director of communicable diseases (tuberculosis)	3,840- 4,500
Assistant director of communicable diseases (venereal diseases)	3,840- 4,500
Venereal disease consultant	3,840- 4,500
Director, Bureau of Dental Hygiene	3,840- 4,500
Director of county health work	4,200- 4,800
Senior health officer	3,840- 4,500
Junior health officer	3,360- 3,840
Health officer trainee	2,400
Assistant director, Hygienic Laboratory	2,640- 3,240
Senior bacteriologist	1,800- 2,400
Senior serologist	1,800- 2,400
Consultant nurse in special fields	2,400- 3,000
Public health nursing supervisor (state)	1,920- 2,400
Public health nursing supervisor (local)	1,800- 2,040
Chief of medical services	4,800- 5,280

WISCONSIN

Lectures on Tropical Medicine. — Dr. Harold William Brown, dean of the University of North Carolina School of Public Health, Chapel Hill, N. C., lectured at the University of Wisconsin Medical School, Madison, April 28, under the auspices of the National Research Council. His subjects were "Malaria" and "Parasitic Infections."

Typical Home Front Physician Chosen.—Dr. Harry A. Keenan, Stoughton, has been selected by *Look* as the typical home front physician in wartime. As the choice of the magazine "he represents the group on whom the community depends for protection and guidance in health and whose great burden is to double its work in order to relieve younger doctors for military service."

Safety Conference. — The sixteenth annual Rock River Valley Safety Conference will be held at the Hotel Rogers, Beaver Dam, May 16. Consideration will be given to women in industry, absenteeism, eye conditions of interest to industrial nurses, employee training as it relates to accident prevention, investigation of accidents for cause, accident prevention in connection with women in industry, safety programs for a county highway department, dust explosion hazards and dangerous dusts.

GENERAL

Warning on Fletcher's Castoria.—The Centaur Company, Rahway, N. J., manufacturers of Fletcher's Castoria, in cooperation with the U. S. Food and Drug Administration on May 5 issued a national warning to all holders of Fletcher's Castoria to discontinue its sale and use because of the discovery that all such Castoria shipped since March 1, 1943 contains a foreign ingredient which causes nausea and vomiting. As neither consumers nor retailers can tell the difference between the packages made before March 1 and those produced thereafter, it is necessary to withdraw and recover all Fletcher's Castoria outstanding. All stocks should be returned to the manufacturer for a refund.

Examinations in Internal Medicine. — The American Board of Internal Medicine will hold regional oral examinations in Philadelphia on May 26-29, Chicago on June 9-11 and New Orleans and San Francisco on dates to be announced later. Oral examinations in the subspecialties will be given at the same time and place. The written examination of the board will be held on October 18. Applications for admission to this examination must reach Dr. William A. Werrell, assistant secretary-treasurer, American Board of Internal Medicine, 1301 University Avenue, Madison, Wis., before September 1. Exceptions will be made in the cases of candidates in the armed forces. Candidates desiring consideration in the subspecialties should file their application at the same time.

Nicholas Appert Medal Awarded to Dr. Prescott.—The Nicholas Appert Medal of the Chicago Section, Institute of Food Technologists, has been awarded to Samuel Cate Prescott, Sc.D., Brookline, Mass., emeritus dean, School of Science, Massachusetts Institute of Technology. Announcement of the award was made at the April 20 meeting of the Chicago Section and presentation will be made at the annual banquet session of the Institute of Food Technologists at the Statler Hotel, St. Louis, June 3. Eligibility for the award, established in 1941, is based on preeminence in the field of food technology and on contributions to the progressive development of food manufacture and processing. Dr. Prescott received his honorary degree from Bates College, Lewiston, Maine, in 1923.

Free Supplement to U. S. P. XII.—Owners of all copies of the U. S. P. XII should fill in and mail the post card order which is tipped inside the back cover of the U. S. P. XII entitling the holder to a copy of the first U. S. P. XII bound supplement soon to be issued. It was not expected that this supplement would be issued until about two and one-half years after the appearance of the U. S. P. XII, but changing conditions and wartime demands have necessitated its immediate publication. The supplement itself will carry a similar order form for a second bound supplement, should the latter be required before the appearance of the U. S. P. XIII. It is expected that the first U. S. P. XII bound supplement will be available within two months, and when it becomes available immediate shipment will be made without further cost to those who mail in their order cards as directed.

Handbook on Rheumatic Fever.—"Rheumatic Fever in Children—Its Recognition and Management," a thirty-two page clinical handbook for the practicing physician, has just been released by the Metropolitan Life Insurance Company and is being made available to physicians without charge chiefly through the 16,000 field representatives of the company. Physicians who wish a copy and who have not secured one by June 1 should write to Dr. George M. Wheatley, New York, assistant medical director, Metropolitan Life Insurance Company, 1 Madison Avenue, New York. The book assembles the modern concepts of the disease, its nature, diagnosis and prognosis and the individual and community problems involved in the care of the patient. A group of clinicians in the following organizations assisted in the preparation of the book: American Heart Association, American Academy of Pediatrics, Children's Bureau of the U. S. Department of Labor and the U. S. Public Health Service. Other educational material has been developed by the Metropolitan Company in connection with its national program to reach the general public and the medical profession with information on rheumatic fever.

CORRECTION

Wilson G. Smillie.—In his discussion on page 8 of THE JOURNAL of May 1, Dr. Wilson G. Smillie's first name was erroneously printed as Watson; also in the ninth line in the second paragraph of Dr. Smillie's discussion on this page, the number of students should have been 3,000 instead of 30,000.

Foreign Letters

LONDON

(From Our Regular Correspondent)

April 3, 1943.

The British Medical Association and the Beveridge Scheme

The meeting of the representative body of the British Medical Association to consider the national medical service proposed in the Beveridge scheme has taken place and the following resolutions have been adopted: 1. That the government's invitation to enter into discussions without commitment be adopted. 2. That a committee representative of the profession as a whole should, in response to the government's invitation, now enter into discussions with representatives of the minister of health on "a scheme for comprehensive health and rehabilitation services for the prevention and cure of disease and restoration of capacity for work available to all members of the community" (assumption B of the Beveridge report) in the light of the following undertakings now given:

1. That at the conclusion of the discussions and at the appropriate time during the discussions, but in any case before negotiations open and before any proposals are submitted to Parliament, the full machinery of the association, including the council and its committees, groups, panel committees, divisions and the representative body, will be used to consider the government's proposals and to decide the association's view thereon.

2. That every practicable step will be taken to give all members of the profession, whether members or nonmembers of the association, an opportunity to express their views, and in particular that every practicable step will be taken to give members of the profession in war service an opportunity of expressing their views, to assess those views and to present them to the meeting or meetings of the representative body called to consider any proposals of the government.

The Employment of the Blind and Deaf

The total number of blind persons in Britain in 1941 was approximately 83,000, of whom about 42,000 were under 16 or over 65 years of age. Of the remainder about 9,000 are in employment. Some are employed in a selected group of ordinary industrial processes such as chocolate packing and testing precision instruments, in which delicacy of touch compensates for blindness. Others are employed in occupations regarded as specially suited to blind persons, such as telephonists, typists, masseurs and piano tuners, or in occupations such as basket and mattress making, which they have learned in blind training institutions. The majority—over 6,000—are employed in blind workshops or under home workers schemes. Of the remaining 32,000 in the 16-65 age group a considerable number have mental and physical defects which make them unemployable. Some do not need to work, such as the blind wives of sighted husbands, and a small proportion are receiving training in institutions.

The education and training of the blind is the duty of the local education authorities, and responsibility for their subsequent welfare is the duty of the local health authorities. These have no obligation to provide employment of a specific character, but nearly all have arranged, generally through a local voluntary association, for employment in workshops for the blind or in work at home. The Committee on the Rehabilitation and Resettlement of Disabled Persons considers that the local education authorities should have the obligation to provide vocational training.

Those blinded in war service are in the special charge of St. Dunstans, an institution established for the purpose after the first world war. This provides treatment on behalf of the Ministry of Pensions and subsequently undertakes full vocational training and assistance in obtaining employment.

Employment of the deaf is a much more limited problem. Local education authorities provide suitable education up to the age of 16 for all children too deaf to be taught in a hearing class and vocational training thereafter. On leaving school at 16 the large majority of deaf children have already received manual or practical instruction to assist them to obtain remunerative employment. In general, deafness is a bar to employment only in certain occupations.

The Electroencephalogram as Evidence Against Criminal Responsibility

The first use of the electroencephalogram in a criminal case as evidence on the question of responsibility was reported in a previous letter (THE JOURNAL, January 2, p. 64). It has just been used a second time. A student aged 20 was charged with the murder of his mother, who was an American, in her London flat. Two physicians gave evidence on his behalf. They knew that before he killed his mother he had drunk 4 pints of beer. They gave him this quantity of mild beer and found that his sugar content was lowered. Tested with the electroencephalograph, the impulses from his brain were found to be erratic and definitely abnormal when his blood sugar was reduced. Charts of these tests were studied by the jury when they retired to consider their verdict. They found him guilty of murder but insane when he killed his mother. He was therefore sentenced "to be detained during the king's pleasure," which means that he will be detained as long as his mental condition is considered dangerous.

Mr. Justice Asquith explained to the jury the celebrated McNaghten rules, which have just reached their centenary. They were laid down by judges in answer to questions put to them in the House of Lords after debates. They lay down that to establish the plea of insanity in a criminal case it must be proved that at the time of the offense the accused was laboring under such a defect of reason as not to know the nature and quality of his act or, if he did know it, he did not know that he was doing wrong. The medical witnesses in the present case agreed that the prisoner was abnormal, but they also said that when he killed his mother he knew what he was doing and knew that he was doing wrong. Mr. Justice Asquith therefore could not advise the jury that the McNaghten rules applied, thus summing up in favor of a verdict of murder simply. The jury would not follow the judge's advice, which they had a perfect right to reject. They were evidently influenced by the abnormal electroencephalograms produced at the trial.

Birth Rate for 1942 the Highest for Fourteen Years

The quarterly return of the registrar general for England and Wales, just published, shows that the total live births for the last quarter of 1942 were 160,679, the highest for any fourth quarter since 1926. For the whole of 1942 the number was 655,075, nearly 68,000 more than in 1941 and the highest since 1928. The rate per thousand of population was 15.8, which was 1.6 higher than in 1941 and the highest since 1931, when the rate was the same. Live births exceed total deaths (both civilian and noncivilian) by 175,168, compared with 52,048 in 1941 and an average of 99,585 for the five years 1936-1940. The improved vital statistics, during the war as well as the diminution of disease, excepting venereal diseases, tuberculosis and cerebrospinal meningitis, which are always increased by war, have been pointed out in previous letters.

Deaths

William Gustav Exton ✠ New York; Columbia University College of Physicians and Surgeons, New York, 1896; member of the American Public Health Association, American Urological Association, Association of Life Insurance Medical Directors, American Association for the Advancement of Science and the American Chemical Society; member and past president of the American Society of Clinical Pathologists; in 1914 became director of the laboratory of the Prudential Life Insurance Company in Newark, N. J., and three years later planned and began the direction of the company's longevity service; an inventor of many diagnostic devices, among them the gastroscope, turbidimeter, euscope, spectroscopic method of colorimetry, scopometer and photoelectric scopometer; in 1933 devised a method for measuring the number, diameters, volume and hemoglobin content of red blood cells; the recipient of the Burdick Memorial Medal of the American Society of Clinical Pathologists; served on the staffs of the Sydenham Hospital, St. Joseph's Hospital and the Mount Sinai Hospital, where he died, March 12, of pneumonia, aged 67.

W. Holbrook Lowell ✠ Boston; Harvard Medical School, Boston, 1902; specialist certified by the American Board of Ophthalmology; member of the American Ophthalmological Society and the New England Ophthalmological Society; an associate in ophthalmology at the Harvard Medical School, Courses for Graduates; consulting surgical ophthalmologist to the Massachusetts Eye and Ear Infirmary, Boston, the Lawrence Memorial Hospital, Medford, Lawrence (Mass.) General Hospital, Massachusetts General Hospital and the Winchester (Mass.) General Hospital; member of the medical advisory committee of district number 34 of Massachusetts during World War I; aged 67; died, March 31, at his home in Winchester of coronary heart disease.

Joseph Dean, Madison, Wis.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1902; specialist certified by the American Board of Surgery; fellow of the American College of Surgeons; member and past president of the state board of health; from 1905 to 1921 associated with the Madison General Hospital; one of the chief sponsors in the building of St. Mary's Hospital, where he was a member of the staff; a bronze plaque bearing his name was erected over the entryway of the hospital; in 1929 he and his brother founded the clinic which bears their name; aged 64; died, March 5, of coronary heart disease.

Adelbert Franklin Williams, Phippsburg, Maine; Dartmouth Medical School, Hanover, N. H., 1897; past president of the Sagadahoc County Medical Society; served in France as a captain in the medical corps of the U. S. Army during World War I; major in the medical reserve corps of the U. S. Army not on active duty; was associated with the U. S. Veterans Bureau in Portland and the Veterans Administration facilities in Augusta and Togus; for ten years chief medical officer at the Portland regional office; aged 72; on the staff of the Bath (Maine) Memorial Hospital, where he died, March 11, of cerebral hemorrhage.

Charles Frederick McComb ✠ Duluth, Minn.; Rush Medical College, Chicago, 1879; an Affiliate Fellow of the American Medical Association and member of the House of Delegates in 1909, 1910 and 1911; for many years coroner of St. Louis County; past president of the Minnesota State Medical Association; the first president of the Interurban Academy of Medicine; twice president and once vice president of the St. Louis County Medical Society; formerly member of the state board of health; served during World War I; aged 85; died, March 3, of pneumonia and arteriosclerotic heart disease.

Lloyd Leroy Krebs ✠ Major, U. S. Army, retired, Sierra Madre, Calif.; University of Pennsylvania Department of Medicine, Philadelphia, 1899; Army Medical School in 1902; entered the U. S. Army as an assistant surgeon in 1901 and was honorably discharged as a captain in 1911; was retired as a major in the medical corps of the U. S. Army in 1912 under a special act of Congress approved in the same year; for many years a member of the staff of the Collis P. and Howard Huntington Memorial Hospital, Pasadena; aged 68; died recently in Pasadena of myocardial infarction and coronary thrombosis.

Paul Virgil Winslow, New York; Albany Medical College, 1908; member of the Medical Society of the State of New York; formerly sanitary supervisor of Dutchess, Greene and Columbia counties for the New York State Health Department; instructor in laryngology at the New York Medical School and Hospital, 1920-1921; at one time on the staffs of the Hudson River State Hospital, Poughkeepsie, and the Brooklyn State Hospital; examining physician at the Army Induction Station; aged 57; died, March 12, in the Flower and Fifth Avenue Hospitals of lobar pneumonia.

C. M. Anderson, Jonestown, Miss.; Memphis (Tenn.) Hospital Medical College, 1903; member of the Mississippi State Medical Association; aged 62; died, March 16, in the Baptist Memorial Hospital, Memphis, of uremia.

Charles Victor Barley, Ithaca, N. Y.; Stanford University School of Medicine, San Francisco, 1928; member of the American Academy of Pediatrics; assistant attending physician, Cornell University Infirmary and Clinic; aged 41; died, March 3, of dissecting aneurysm and coronary occlusion.

Royal August Becker, Atlantic, Iowa; State University of Iowa College of Homeopathic Medicine, Iowa City, 1910; member of the Iowa State Medical Society; served during World War I; on the staff of the Atlantic Hospital; aged 56; died, March 6, of congestive heart disease.

John Henry Belyea, Los Molinos, Calif.; St. Louis College of Physicians and Surgeons, 1889; member of the California Medical Association; aged 78; died, March 6, in St. Elizabeth's Mercy Hospital, Red Bluff, of cerebral hemorrhage and arteriosclerosis.

Harry Walrod Blair, Mount Vernon, Ohio; University of Wooster Medical Department, Cleveland, 1892; member of the Ohio State Medical Association; served as a captain in the medical corps of the U. S. Army during World War I; for many years health officer; aged 77; died, February 19, of cerebral hemorrhage.

William C. Bovard, Apollo, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1878; aged 91; died, March 1, in the Citizens General Hospital, New Kensington, of coronary thrombosis.

John Clinton Boyer, Ocean City, N. J.; Jefferson Medical College of Philadelphia, 1898; aged 70; died, March 12, of cerebral hemorrhage and arteriosclerosis.

Walter Miles Browning, Waurika, Okla.: Memphis (Tenn.) Hospital Medical College, 1897; member of the Oklahoma State Medical Association; formerly a druggist; aged 73; died, February 5, in the Medical Arts Hospital, Dallas, Texas.

Francis E. Butler ✠ Menomonie, Wis.; Milwaukee Medical College, 1903; president of the State Medical Society of Wisconsin and formerly councilor of the Tenth District; past president of the Dunn-Pepin Counties Medical Society; fellow of the American College of Surgeons; founded the Menomonie Clinic; on the staff of the Menomonie City Hospital; a member of the Menomonie Chamber of Commerce, the Rotary Club and the city council; aged 62; died, March 12, of carcinoma of the prostate.

Fred Allen Cobb, Toledo, Ohio; Toledo Medical College, 1894; member of the Ohio State Medical Association; formerly city councilman; served during World War I; aged 77; member of the emeritus staff of the Robinwood Hospital, where he died, March 9, of a fracture of the hip from a fall and paralysis agitans.

Warren Hamilton Conner, Los Angeles; State University of Iowa College of Homeopathic Medicine, Iowa City, 1893; aged 87; died, March 1.

Joseph Edgar Dibble, Kansas City, Mo.; Meharry Medical College, Nashville, Tenn., 1895; veteran of the Spanish-American War; first lieutenant in the medical reserve corps of the U. S. Army not on active duty; on the staffs of the Wheatley-Provident Hospital and the Kansas City General Hospital, number 2; surgeon for the Kansas City Southern Railroad; aged 69; died, March 9, of cerebral hemorrhage and vascular hypertension.

Frank Newcomer Emmert, Chambersburg, Pa.; Bellevue Hospital Medical College, New York, 1898; member and at one time vice president of the Medical Society of the State of Pennsylvania; past president of the Franklin County Medical Society; treasurer for many years and on the staff of the Chambersburg Hospital; aged 69; died, March 15, in Jacksonville, Fla.

Hicks C. Fenton, Portland, Ore.; University of Oregon Medical School, Portland, 1893; aged 74; on the staff of St. Vincent's Hospital, where he died, February 6, of coronary occlusion.

Royce Day Fry, Euclid, Ohio; Western Reserve University Medical Department, Cleveland, 1883; veteran of the Spanish-American War; aged 87; died, February 21.

William H. Funkhouser, Evansville, Ind.; Louisville (Ky.) Medical College, 1882; aged 85; died, February 7, in an Indianapolis hospital.

William W. Greenwood, Navasota, Texas; University of Texas School of Medicine, Galveston, 1899; member of the State Medical Association of Texas; health officer of Navasota; served as president of the school board and as local surgeon for the Southern Pacific and Missouri Pacific railroads; aged 68; on the staff of the Brazos Valley Sanatorium, where he died, March 2, of meningitis.

Maurice William Gumpert, Huntington Park, Calif.; University of California Medical School, San Francisco, 1930; member of the California Medical Association; aged 42; died, February 24, in Los Angeles of carcinoma of the stomach.

Edwin Arnold Hyatt ✠ St. Albans, Vt.; McGill University Faculty of Medicine, Montreal, Que., Canada, 1902; past president of the Vermont State Medical Society; member of the staff of St. Albans Hospital; aged 67; died, February 14.

Thurlow Milton Jewell, Milford, Iowa; Northwestern University Medical School, Chicago, 1929; aged 38; died, February 14, in Spencer of bronchopneumonia.

Emil E. Johnson ✠ Cortez, Colo.; Chicago College of Medicine and Surgery, 1912; past president of the San Juan Medical Society; formerly owner and superintendent of a hospital bearing his name; served as alderman, mayor, county physician and health officer for many years; aged 61; died, February 15, in Santa Monica, Calif., of coronary thrombosis.

Paul Vincent Joyce ✠ Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1912; served as a lieutenant in the medical corps of the U. S. Army during World War I; formerly a police surgeon; on the staffs of the Wesley Memorial Hospital, St. Anthony's Hospital and the Washington Boulevard Hospital, now closed; aged 59; died, April 30.

Frederick Anton Keller, Falls City, Neb.; Ensworth Medical College, St. Joseph, Mo., 1902; aged 64; died, March 3, of diabetic gangrene.

Edward Martin Lawler, Cudahy, Wis.; Marquette University School of Medicine, Milwaukee, 1932; member of the State Medical Society of Wisconsin; aged 36; died suddenly, February 27, of coronary thrombosis.

Louis Loveman Lefkowitz ✠ New York; University and Bellevue Hospital Medical College, New York, 1921; specialist certified by the American Board of Pathology, Inc.; served as assistant professor of pathology at the New York University Dental School; was president of the Bronx Pathological Society; an assistant medical examiner of the Bronx; on the staffs of the Bronx and Montefiore hospitals; aged 44; died, March 6, of coronary thrombosis.

Gustav Herman Luedtke ✠ Fairmont, Minn.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1899; for many years health officer of Fairmont; served as a major in the medical corps of the U. S. Army during World War I; on the staffs of the Fairmont Community and Hunt hospitals; aged 72; died, March 18, of carcinoma of the prostate.

J. Carroll Montgomery, Topeka, Kan.; College of Physicians and Surgeons, Medical Department Kansas City University, Kansas City, 1901; formerly associated with the U. S. Public Health Service; at one time health officer of Sedgwick County and Cherokee County; formerly director of child hygiene and rural sanitation, Kansas State Board of Health; served as secretary of the Kansas Public Health Officers' Association; aged 68; died, February 2, of cerebral arteriosclerosis.

Hugh Lewers Murphy, Arkabutla, Miss.; Louisville (Ky.) Medical College, 1905; member of the Mississippi State Medical Association; aged 60; died, February 20, in the City Hospital, Indianapolis, of cerebral hemorrhage.

Nathaniel Otis Owens, Quincy, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1897; member of the Missouri State Medical Association; aged 69; died, March 2, of heart disease.

William Bradley Palmer, Furman, Ala.; Medical Department of Tulane University of Louisiana, New Orleans, 1898; aged 75; died, March 1, in a hospital at Atlanta, Ga., of coronary occlusion with rupture of the left ventricle, malignant nephrosclerosis and arteriosclerosis.

Halfdan Raasoch, Nelsonville, Wis.; Rush Medical College, Chicago, 1896; for seventeen years school clerk; village president and for many years health officer; aged 70; died, February 19, of angina pectoris.

Roland Ray Reed ✠ McCook, Neb.; University of Nebraska College of Medicine, Omaha, 1910; served overseas with Field Hospital unit number 40 during World War I; aged 56; died, February 13, of coronary disease.

Martin Abraham Reichman, Morrisonville, Ill.; University of Illinois College of Medicine, Chicago, 1929; member of the Illinois State Medical Society; served as a member of the local board of health; aged 38; died, February 27.

Charles Freelan Rosenberg, Milwaukee; University of Wisconsin Medical School, Madison, 1936; at one time a member of the staff of the Normandale, Madison; aged 33; died, February 27, in the Columbia Hospital of coronary thrombosis secondary to emboli from osteomyelitis.

Frank Louis Sharpe, Statesville, N. C.; University of North Carolina School of Medicine, Chapel Hill, 1904; member of the Medical Society of the State of North Carolina; aged 74; died, February 20.

Oliver O. Simpson, Norcross, Ga.; Atlanta Medical College, 1882; formerly member of the state legislature, county commissioner of Gwinnett County and mayor of Norcross; aged 85; died, March 4, in the Emory University (Ga.) Hospital of thrombosis.

Douglas Bins Staggs, Monmouth, Iowa; Hahnemann Medical College and Hospital, Chicago, 1896; aged 71; died, February 13, in Anamosa of acute general peritonitis.

Tully A. Sumners, Nevada, Texas; University of Tennessee Medical Department, Nashville, 1894; formerly on the staff of St. Paul's Hospital, Dallas; aged 70; died, February 27, of angina pectoris.

Carl Whit Sutton ✠ Richlands, N. C.; Medical Department of Tulane University of Louisiana, New Orleans, 1905; aged 60; died, February 20, in the Memorial General Hospital, Kinston, of cirrhosis of the liver.

Routon Beverly Taylor, Jena, La.; College of Physicians and Surgeons, Little Rock, 1911; aged 69; died recently at the Vaughan-Wright-Bendel Clinic, Monroe.

Willis Stimson Taylor, Columbus, Ohio; Eclectic Medical Institute, Cincinnati, 1885; for many years associated with the board of health of Franklin County; aged 83; died, February 14, in the Grant Hospital of thrombosis.

W. T. White, Ratcliff, Ark. (licensed in Arkansas in 1903); aged 60; died recently.

Allen Bishop Wilson, Hagerstown, Md.; Leonard Medical School, Raleigh, N. C., 1902; aged 66; died, February 20, of pulmonary tuberculosis.

Frank Le Roy Young, Knoxville, Tenn.; University and Bellevue Hospital Medical College, New York, 1906; member of the Tennessee State Medical Association; at one time professor of otology, laryngology and rhinology at the Lincoln Memorial University Medical Department; aged 63; died, February 18.

Claude Youtsey, Newport, Ky.; Medical College of Ohio, Cincinnati, 1903; member of the Kentucky State Medical Association; past president of the Campbell County Medical Society; served as president of the Campbell County Board of Health and for many years as a member of the board of health of Newport; chief of the medical staff and vice president of the board of directors of Speer's Memorial Hospital, Dayton; medical examiner for the Selective Service Board number 21; aged 61; died, March 5, of carcinoma of the right lung.

DIED WHILE IN MILITARY SERVICE

Lewis Edward Barrick, Chicago; Northwestern University Medical School, Chicago, 1940; first lieutenant in the medical corps of the Army of the United States; aged 29; died, January 9, in Denmark, Iowa, of injuries received in an airplane accident.

Jay Henry Caldwell, Long Beach, Calif.; College of Medical Evangelists, Los Angeles, 1941; first lieutenant in the medical corps, Army of the United States; aged 33; died, February 27, in an airplane accident at Santa Ana.

John Morgan Clack, West Point, Ga.; University of Tennessee College of Medicine, Memphis, 1929; member of the Medical Association of the State of Alabama; past president of the Chambers County (Ala.) Medical Society; first lieutenant in the medical corps of the Army of the United States; aged 37; died, January 30, in Edmonton, Canada, of a coronary thrombosis.

John Patrick Gavan, Cleveland; St. Louis University School of Medicine, 1929; a member of the staff of St. John's Hospital; captain in the medical corps of the United States Army Air Corps; aged 40; died, February 22, at Mitchel Field, Long Island, N. Y., of pneumonia.

Correspondence

THE PHYSICAL FITNESS PROGRAM

To the Editor:—It was my privilege recently to visit one of the Navy preflight schools in which the emphasis is on indoctrination, certain phases of technical training, and physical fitness. At this school they have, in addition to the regular Navy line officers and a specially commissioned staff of physical education and athletic leaders, a remarkably fine medical and dental staff organization. These physicians and dentists are doing a splendid job in examination, surgery, care of injuries and illness, and guidance, as far as excuse from regular activity and class work for medical reasons is concerned. Infirmary and hospital facilities of an outstanding type are available and are being well used. In addition to the usual entrance medical examination, this medical group is administering a mass x-ray examination of the lungs by use of a 35 mm. film unit.

The program at this preflight school at one time involved approximately six hours of physical training per day. This has now been reduced to the equivalent of three hours of physical training a day, for various reasons. The usual physical training period for the Army and Navy, I am told, is one hour per day at the earlier and later aviation training stages.

The end results of this program have been evaluated in terms of physical measurements, speed, and exercise tests based on pulse response to a modification of the step test. This testing program is conducted by the physical education phase of the school. The objective testing demonstrates average improvement in the physical speed and improved exercise response, and anthropometric measurements.

The medical group is doing a magnificent job, but it should be pointed out to the general medical profession in this country that, while the physical education group at the school is testing for objective results of this most intensive physical training program in history in America, the medical group and dental group at this station are limited pretty much to a clinical and empirical opinion as to the evaluation of what might be called medical results of the program. At certain advanced naval aviation training schools a research medical program is being administered.

It appeared to me that, with this tremendously intensive program of physical strain, medicine is overlooking a great opportunity for the obtaining of scientific knowledge of the medical results of intensive physical activity such as is being administered in this first experiment in American history. The medical officers themselves seem interested in such an opportunity; for example, a more comprehensive entrance examination with an opportunity for a similar comprehensive follow-up examination at the end of the program under controlled conditions. Under present circumstances the staff is so limited, as is the very outstanding staff of the adjacent medical college, that such follow-up does not seem practical because, as several stated, "This is war."

Under the conditions of a great opportunity to do further investigation as to the results of intensive exercise on a level never before seen and a marvelous medical setup in a great medical center, it remains for the Navy to allow the medical follow-up program or for the physical fitness committee of the American Medical Association to set up and subsidize such a program, if the consent of the Navy could be obtained. It is such a wonderful opportunity to get facts heretofore not available that I urge its importance on the officials and the appropriate committee of the American Medical Association.

The research work now being done, for example in cardiology on the advanced flying basis, is magnificent, but this work is not being done on a group of potential aviators who are undergoing an intensive physical education activity program such as that which is being administered in the preflight schools. Statistics on the reasons for morbidity and "wash out" (academic and medical) are not fully available at the various preflight schools. The results of this intensive program cannot be said to be as yet scientifically evaluated. Such evaluation is a medical challenge, a physical education challenge, and I suggest the extreme desirability of the medical group attempting to make possible such investigation, so that future programs and the inevitable after war physical fitness program may be more intelligently, scientifically and less empirically approached.

I trust that this suggestion may not be misunderstood by anybody, as I believe a magnificent piece of work is being done by these preflight schools in toughening and training future naval aviators. My only point is that we cannot know scientifically what the end result of such intensive training may be, especially for certain men who enter training without having been particularly athletic, and such investigation would seem to be tremendously significant, particularly in respect to the possible cardiac, pulmonary, renal and neuropsychiatric effects, as well as in its more obvious traumatic aspects.

J. W. WILCE, M.D., Columbus, Ohio.
Director, University Health Service,
Ohio State University.

THERAPY OF SEVERE BURNS

To the Editor:—An editorial comment (THE JOURNAL, April 3, p. 1157) on the "Therapy of Severe Burns" calls attention to the report of Elman, Cox, Lischer and Mueller (*Proc. Soc. Exper. Biol. & Med.* **51**:350 [Dec.] 1942). These authors, working with experimental burns in rats, demonstrated that the acute mortality was greatly elevated in animals kept at environmental temperatures of 32, 55 and 99 F. as compared with groups of rats kept at 75 F.

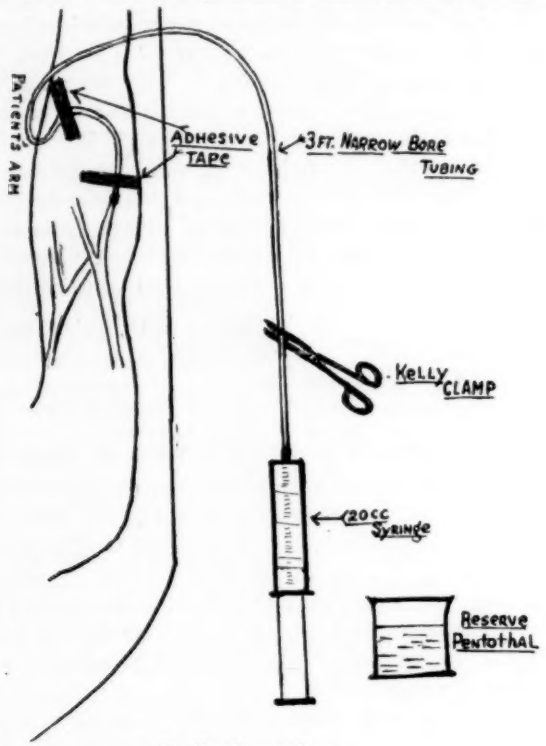
May I call your attention to the fact that I have reported similar results in mice in an article entitled "Experimental Chemotherapy of Burns and Shock: I. Methods. II. Effects of Local Therapy on Mortality from Shock" (*Pub. Health Rep.* **57**:1923 [Dec. 18] 1942), which appeared simultaneously with the publication cited. Mention should also be made of the recent article of Wakim and Gatch, "Effects of Temperature on Shock," which appeared in THE JOURNAL, March 20, page 903. They came to essentially the same conclusions as to the harmful effects of heat and cold in traumatic shock, as a result of their experiments on several species of animals.

Because of their possible clinical significance may I also mention the results I have recently obtained in the treatment of burn shock in mice (*Pub. Health Rep.* **58**:513 [March 26] 1943). Evidence was presented that the acute mortality following a standardized burn is primarily related to a sodium deficiency, since death can be prevented by therapy with sodium salts by mouth, and this effect can be antagonized by potassium salts. Intravenous therapy was less effective than other routes of administration.

SANFORD M. ROSENTHAL, M.D., Bethesda, Md.
Principal Pharmacologist, U. S. Public Health Service.

METHOD OF ADMINISTERING PENTOTHAL SODIUM

To the Editor:—In the March 6 issue of THE JOURNAL, Capt. Robert B. Hope described a holder for the administration of pentothal sodium. We have at our institution a much simpler method which places the anesthetist at the head of the table where he belongs so that he may administer oxygen and further observe the patient. The accompanying diagram tells the nature of the method. There is about 3 feet of narrow gage tubing that fits on the end of a 20 cc. syringe and has an adapter at the other end to take a 22 long needle. This is inserted in the vein and secured there with adhesive tape as noted. The tubing is pinched off when the injection is not being made with an old Kelly clamp, so that there is no backflow of blood into the needle, tubing and syringe. The tubing holds about 3 cc. of pentothal. With this arrangement we have done all types of operations and it has been uniformly satisfactory. For wartime use if there is a shortage of hands one could have a nurse



Details of method.

or orderly at the head of the patient and the doctor could assist the operator in an emergency and still give the anesthetic if the tubing and the syringe with the pentothal was sterile and could be brought into the field. This method has been used in over five hundred operations and I pass it along with the hope that some one may want to use the technic.

F. J. PATTENDEN, M.D., Neptune, N. J.
Senior Anesthetist, Fitkin Memorial Hospital.

"THE GOOD SURGEON"

To the Editor:—A number of friends have called my attention to a quotation attributed to Dr. John M. T. Finney which appeared on page 1312 of the Dec. 19, 1942 issue of THE JOURNAL.

The quotation was taken from an editorial in the August 1918 issue of *War Medicine*; it was written by Dr. George Crile but not signed. Later the material was used in an address read by Dr. Crile before the American Surgical Association on June 16, 1919. Instead of the original title, "The Good Surgeon: The Most Important Factor in the Treatment of War Wounds," the heading was "The Most Important Factor in the Treatment of War Wounds and the Most Important Factor in Civilian Surgery—the Good Surgeon." This was published in the *Annals of Surgery* in October 1919, the article being almost identical with the editorial in *War Medicine*. It also appeared in the Transactions of the Association.

I was much interested in this recent reference to an article written during the first world war and feel sure you will want to correct your statement regarding the authorship.

GRACE CRILE,
2620 Derbyshire Road, Cleveland Heights, Ohio.

TREATMENT OF CEREBROSPINAL MENINGITIS

To the Editor:—The editorial "Treatment of Cerebrospinal Fever" (THE JOURNAL, February 13, p. 516) may create an erroneous impression as regards the mortality from the disease in this country. For instance, since Jan. 1, 1937 all epidemic meningitis patients admitted to the Division of Contagious Diseases, City Hospital, Cleveland, have been treated according to the method described by Hoyne, i. e. with a continuous intravenous drip of meningococcus antitoxin and at the same time massive doses of sulfanilamide by mouth, if possible. Lumbar punctures were made only for diagnosis. In 75 consecutive cases there were five deaths—a gross mortality rate of 6⅔ per cent; only 1 patient had a complication—loss of hearing. Among 5 who succumbed was 1 who died fifty-five minutes after admission and a 50 year old woman with diabetes and gangrene who had recovered from the spinal meningitis and whose spinal fluid, at the time of death from other causes, contained only 69 cells. If we exclude these patients the mortality rate would be 4.1 per cent. Of the remaining 3 persons 1 died nineteen and one-half, 1 twenty and 1 twenty-eight hours after admission to the hospital.

JOHN A. TOOMEY, M.D.
JOHN H. DAVIS, M.D.
Department of Pediatrics, Western Reserve University, and Division of Contagious Diseases City Hospital.
Cleveland.

EDIBILITY OF RABBITS USED FOR PREGNANCY TESTS

To the Editor:—The communication by Drs. Weisman and Coates in THE JOURNAL, March 27, page 1109, starts with the unwarranted assumption that rabbits utilized for pregnancy (Friedman) tests are unsuitable for food and that therefore a less satisfactory test should be substituted.

If rabbits are apparently in good condition when killed in order to read the test, they are as edible as litter mates which are killed primarily for food. Various members of my staff have been eating test rabbits for years with no harmful effects: they are more sought after now than previously, because of meat rationing. The line forms on the right.

Why should such animals not be eaten? The urine which was injected into their veins came from human beings who passed all the urinary materials through the blood without any toxic effects; and the hormones which produced the ovarian changes are among the profession's modern panaceas.

Let's conserve our professional and nutritional resources by making the rabbits do double duty.

If you're not a Babbit,
You'll enjoy the rabbit
That entered into rest
To give a Friedman test.

While it may seem funny,
You'll enjoy the bunny,
Who's done her double duty
For Victory and Beauty.

E. D. PLASS, M.D., Iowa City.
Professor of Obstetrics and Gynecology, State University of Iowa College of Medicine.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, May 8, page 133.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 15-16. Sec., Dr. B. F. Austin, 519 Dexter Ave., Montgomery.

ARKANSAS: * *Medical.* Little Rock, June 3-4. Sec., Dr. D. L. Owens, Harrison. *Eclectic.* Little Rock, June 3-4. Sec., Dr. C. H. Young, 1415 Main St., Little Rock.

CALIFORNIA: San Francisco, June 28-July 1. *Oral.* Los Angeles, August 9. Sec., Dr. Frederick N. Scatena, 1020 N Street, Sacramento.

CONNECTICUT: * *Written.* Hartford, July 13-14. *Reciprocity.* Hartford, July 27. Sec. to the Board, Dr. Creighton Barker, 258 Church St., New Haven. *Homeopathic.* Derby, June 8-9. Sec., Dr. J. H. Evans, 1488 Chapel St., New Haven.

DELAWARE: Dover, July 13-15. *Reciprocity.* Dover, July 20. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

FLORIDA: * Jacksonville, June 21-22. Sec., Dr. William M. Rowlett, Box 786, Tampa.

HAWAII: Honolulu, July 12-15. Sec., Dr. J. A. Morgan, 55 Young Building, Honolulu.

IDAHO: Boise, July 13. Dir., Bureau of Occupational Licenses, Mrs. Lela D. Painter, 355 State Capitol Building, Boise.

ILLINOIS: Chicago, June 22-24. Superintendent of Registration, Department of Registration and Education, Mr. Philip M. Harman, Springfield.

INDIANA, Indianapolis, Sept. 14-16. Sec., Board of Medical Registration & Examination, Dr. W. C. Moore, 301 State House, Indianapolis.

KANSAS: Kansas City, May 19-20. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, Nov. 15-17. Sec., Dr. A. T. McCormack, 620 S. Third St., Louisville.

MAINE: Augusta, July 6-7. Sec., Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Homeopathic.* Baltimore, June 15-16. Sec., Dr. J. A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, July 13-16. Sec., Board of Registration in Medicine, Dr. H. Q. Gallupe, 413-F State House, Boston.

MICHIGAN: * Ann Arbor and Detroit, June 11-13. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 100 W. Allegan St., Lansing.

NEW HAMPSHIRE: Concord, Sept. 9-10. Sec., Board of Registration in Medicine, Dr. D. G. Smith, State House, Concord.

NEW JERSEY: Trenton, June 15-16. Sec., Dr. E. S. Hallinger, 28 W. State St., Trenton.

NORTH CAROLINA: Raleigh, June 14-18. Sec., Dr. W. D. James, Hamlet.

NORTH DAKOTA: Grand Forks, July 6-9. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: *Endorsement.* Columbus, July 7. *Written.* Columbus, Dec. 4. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

SOUTH CAROLINA: Columbia, June 28-30. Sec., Dr. N. B. Heyward, 1329 Blandena St., Columbia.

SOUTH DAKOTA: * Pierre, July 20. Act. Dir., Medical Licensure, State Board of Health, Dr. A. Triolo, Pierre.

TEXAS: Dallas, June 1-3. Sec., Dr. T. J. Crowe, 918-20 Texas Bank Bldg., Dallas.

UTAH: Salt Lake City, June. Dir., Department of Registration, Mr. G. V. Billings, 324 State Capitol Bldg., Salt Lake City.

WEST VIRGINIA: Charleston, July 6-8. Commissioner, Public Health Council, Dr. C. F. McClintic, State Capitol, Charleston.

WYOMING: Cheyenne, June 7-8. Sec., Dr. M. C. Keith, Capitol Building, Cheyenne.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA: Tucson, June 15. Sec., Dr. Robert L. Nugent, Science Hall, University of Arizona, Tucson.

ARKANSAS: Little Rock, May 17. Sec., Mr. L. E. Gebauer, 701 Main St., Little Rock.

COLORADO: Denver, June 9-10. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver.

CONNECTICUT: June 12. Address State Board of Healing Arts, 250 Church St., New Haven.

FLORIDA: DeLand, June 9. Final date for filing application is May 24. Sec., Dr. J. F. Conn, John B. Stetson University, DeLand.

NEW MEXICO: June 14. Sec., Miss Pia Joerger, State Capitol, Santa Fe.

OREGON: Corvallis, July 10. Sec., State Board of Higher Education, Mr. C. D. Byrne, University of Oregon, Eugene.

RHODE ISLAND: Providence, May 19. Chief, Division of Examiners, Mr. Thomas B. Casey, 366 State Office Building, Providence.

SOUTH DAKOTA: Aberdeen, June 4-5. Sec., Dr. G. M. Evans, Yankton.

WISCONSIN: Milwaukee, June 5. Sec., Prof. R. N. Bauer, 152 W. Wisconsin Ave., Milwaukee.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Medical Practice Acts: Power of Licensing Board to Reinstate Revoked License.—Buonanno was licensed to practice medicine and surgery in West Virginia in 1927. In 1930, after notice and hearing, the public health council, the state agency charged with the duty of examining and licensing applicants for licenses to practice medicine and surgery and with revoking or suspending licenses for causes stated in the medical practice act, revoked Buonanno's license on the ground of dishonorable conduct on his part in submitting to the council a fraudulent medical diploma in applying for the license he obtained. Buonanno did not appeal from the order of revocation. In March 1934 he applied to the council for reinstatement of the revoked license, presenting a diploma purportedly issued to him by the Medical College of the University of Rio de Janeiro indicating the completion in that institution of a course of study in medicine and surgery. The council ascertained that the diploma was not genuine and denied the application. He made several other fruitless attempts to induce the council to reinstate his license. In January 1940 he petitioned the circuit court of Marion County, West Virginia, for a review of the action of the council. The trial court sustained the council's demurrer to the petition and dismissed the action. Buonanno took no appeal from the action of the court. In November 1941 he again applied to the council for reinstatement and was notified that the council would pass on the application at a meeting in March 1942. Thereon the West Virginia State Medical Association sought a writ of prohibition to prevent the council from considering further the restoration of Buonanno's revoked license. The association alleged that Buonanno was not legally qualified to practice medicine and surgery in West Virginia, that if he were permitted to practice it would tend to degrade the professional standards of its members and that the revocation of his license by the council had long since become final by reason of his failure to appeal from the order of revocation entered in 1930 and that the council had no jurisdiction to consider further the restoration of his license. Buonanno, on his own motion, was made a party to the proceedings and demurred to the petition for a writ of prohibition for the alleged reason that the council had the legal power, if it saw fit, to reinstate his revoked license and that the court was without jurisdiction to prohibit the council from doing so. The trial court overruled the demurrer and he appealed to the Supreme Court of Appeals of West Virginia.

The writ of prohibition, Buonanno contended on appeal, does not lie to control the action of a board, such as the council, having only administrative functions. True, said the court, if the public health council possesses only administrative powers, a writ of prohibition to control it in the exercise of those powers should not issue. But the council, in addition to its purely administrative functions, has and exercises quasi-judicial powers and jurisdiction with respect to the suspension and revocation of licenses. It is not a judicial tribunal but in its own sphere it may hear and evaluate the evidence on a contested matter and make a finding which is subject to review by courts. While there is no express provision in the medical practice act or elsewhere authorizing the council to reinstate a revoked license to practice medicine, if it has that power, as cognate to the powers of revocation and suspension, that power and jurisdiction must necessarily be quasi-judicial. Since the council is a quasi-judicial body, a writ of prohibition will lie to prevent it when acting in its quasi-judicial capacity from exceeding its legal authority. The trial court therefore had jurisdiction and, if in fact the council is attempting to exceed its jurisdiction and lawful power in restoring Buonanno's license, prohibition will lie to restrain the council from doing so.

The Supreme Court of Appeals then considered the right of the council, under the circumstances present in this case, to reinstate Buonanno's revoked license. After the revocation of

Buonanno's license, said the court, in 1930 by the council, the only course left to him was to present the necessary valid, qualifying certificate of graduation from an approved medical school and take a new examination or within thirty days after the entry of the order of revocation to perfect an appeal to the courts. Buonanno did not apply for a new examination but attempted repeatedly to induce the council to reinstate his license. He did not appeal to the courts from the order of revocation. In 1940 he instituted an action in the circuit court of Marion County to review the council's refusal to reinstate his revoked license, not to review the propriety of the order of revocation. The propriety of the order of revocation could not be reviewed by the courts unless the court proceeding were instituted within thirty days after the entry of the order of revocation. In the absence of a statutory provision otherwise specifically fixing the finality of an order of the council revoking a license, we hold, said the court, that the statute limiting the time for an appeal determines that question and that an order becomes final for all purposes after the expiration of thirty days and cannot thereafter be set aside or vacated by the council. The order of revocation entered in 1930 is final for another reason: When the medical association instituted this proceeding more than eleven years had elapsed since the order revoking Buonanno's license was entered and the order had not been vacated, modified or successfully challenged during that time. There must be a finality to proceedings before the council. To hold otherwise would result in a state of uncertainty and confusion, preventing the orderly performance of council duties. We believe that the lapse of time alone is sufficient to give the order of revocation finality and that the council is precluded from a reconsideration of its order, especially in view of the proceedings instituted by Buonanno in the circuit court of Marion County for review and reversal of the council's refusal to reinstate the revoked license. We therefore hold that the license of Buonanno has been finally and completely revoked prior to commencement of this proceeding and that he now has the same status with respect to the practice of medicine and surgery as if a license had not been issued to him.

For the reasons stated, the order of the lower court in effect prohibiting the council from considering the restoration of Buonanno's license was affirmed.—*West Virginia State Medical Ass'n v. Public Health Council of West Virginia, 23 S. E. (2d) 609 (W. Va., 1942).*

Society Proceedings

COMING MEETINGS

HOUSE OF DELEGATES OF THE AMERICAN MEDICAL ASSOCIATION, CHICAGO, BEGINNING JUNE 7. DR. OLIN WEST, 535 NORTH DEARBORN ST., CHICAGO, SECRETARY.

American Association of Genito-Urinary Surgeons, Stockbridge, Mass., June 10-12. Dr. Charles C. Higgins, 2020 East 93d St., Cleveland, Secretary.

American Association of Industrial Physicians and Surgeons, Rochester, N. Y., May 25-27. Dr. E. C. Holmblad, 28 East Jackson Blvd., Chicago, Managing Director.

American College of Radiology, Chicago, June 6. Mr. Mac F. Cahal, 540 North Michigan Blvd., Chicago, Executive Secretary.

American Ophthalmological Society, Hot Springs, Va., June 10-12. Dr. Walter S. Atkinson, 129 Clinton St., Watertown, N. Y., Secretary.

American Society of Clinical Pathologists, Chicago, June 4-6. Dr. Alfred S. Giordano, 531 North Main St., South Bend, Ind., Secretary.

Connecticut State Medical Society, New Haven, May 25-27. Dr. Creighton Barker, 258 Church Street, New Haven, Secretary.

Illinois State Medical Society, Chicago, May 18-20. Dr. Harold M. Camp, 224 South Main St., Monmouth, Secretary.

Massachusetts Medical Society, Boston, May 24-26. Dr. Michael A. Tighe, 8 Fenway, Boston, Secretary.

Minnesota State Medical Association, Minneapolis, May 17-19. Dr. B. B. Souster, 493 Lowry Medical Arts Bldg., St. Paul, Secretary.

Montana, Medical Association of, Billings, July 7-8. Dr. Thomas F. Walker, 206 Medical Arts Building, Great Falls, Secretary.

New Jersey, Medical Society of, Newark, May 25-26. Dr. Alfred Stahl, 55 Lincoln Park, Newark, Secretary.

Rhode Island Medical Society, Providence, June 2-3. Dr. William P. Buffum, 122 Waterman St., Providence, Secretary.

West Virginia Medical Association, Charleston, May 17-18. Mr. Charles Lively, 1031 Quarrier St., Charleston, Executive Secretary.

CENTRAL SOCIETY FOR CLINICAL RESEARCH

Fifteenth Annual Meeting, held in Chicago, Nov. 6 and 7, 1942

The President, DR. ARLIE R. BARNES, Mayo Clinic, Rochester, Minn., Presiding

(Concluded from page 136)

Clinical Use of Papaverine in Coronary Heart Disease

DRS. LOUIS N. KATZ and STEPHEN R. ELEK, Chicago: Papaverine, a non-habit forming opium alkaloid of the benzylisoquinoline group, has been used abroad in angina pectoris but has received practically no attention in this country for this condition. Experiments have shown that it is a powerful coronary vasodilator, and experiences in this laboratory have demonstrated that it can abolish ventricular fibrillation and premature ventricular systoles in the dog and can also act prophylactically to prevent their occurrence.

We have therefore investigated its action clinically on patients with angina pectoris and on those with premature systoles. Three groups of patients were studied. In the first group were 17 ambulatory patients with an established severe anginal syndrome given papaverine by mouth 1½ grains (0.1 Gm.) four times a day alternately with control periods on placebo. These patients kept a diary and were closely followed over periods of from five to eleven months. The effect was judged by comparing frequency of anginal attacks, duration of each attack, number of blocks patient could walk without pain, and amount of glyceryl trinitrate used. Twelve showed definite improvement on papaverine, 3 were inconclusive and 2 were slightly improved.

In the second group, included among other arrhythmias, there were 12 patients with frequent premature systoles. The effect of intravenous papaverine 1 to 1½ grains (0.06 to 0.1 Gm.) was followed. In all there was a definite reduction or abolition of the premature beats for two to ten minutes after the injection. In 1 case the use of a slow intravenous drip (1½ grains in 125 cc. of isotonic solution of sodium chloride) led, after 1 grain had been administered, to disappearance of the multiple ectopic beats for several hours.

In the third group, 5 patients with frequent premature systoles were hospitalized and the effects of periods under oral papaverine, 1½ to 3 grains (0.1 to 0.2 Gm.) four to five times daily were tested and compared with control periods and with periods on quinidine. The premature systoles were counted three times a day (sometimes hourly) during the control and drug periods. In all cases papaverine had a definite effect in decreasing the frequency or in abolishing the premature systoles, and the effect was equivalent to that of quinidine.

It was concluded from these studies that papaverine is of value in the alleviation of pain in angina pectoris and in the eradication of premature systoles. There is no contraindication to its oral use and little to its use intravenously. Because of these two actions, and its definite sedative action, papaverine has a definite place in the treatment of chronic coronary disease complicated by anginal pain or premature systoles. In the latter it may be considered a measure which can be taken to lessen the risk of fatal ventricular fibrillation. It appears to carry none of the hazards of quinidine, since it does not depress the heart's contraction. When used orally it must be given in larger doses than those ordinarily employed.

DISCUSSION

DR. GEZA DE TAKATS, Chicago: Since 1936 my associates and I have been using papaverine in acute vascular accidents intravenously in much smaller doses than the authors have mentioned. It was only natural to try to follow intravenous doses with oral doses in patients with peripheral vascular disease. We used 1 grain of papaverine three times a day orally. I cannot remember the exact number of patients but it must have been 20 to 25. The majority have become uncomfortable on these doses. Perhaps the massive doses that the authors mentioned might have counteracted the effect of smaller doses. Our patients would get out of bed and wander around. One patient had intractable obstipation. I should like to ask what the longest period was during which the authors used papaverine and what the effects were on withdrawal.

DR. EDWARD MASSIE, St. Louis: I should like to ask if there were any other electrocardiographic effects of papaverine apart from its effect on the rhythm.

DR. PAUL NOTH, Detroit: In view of all the difficulties in evaluating the subjective response to drug therapy in angina pectoris, would the tests performed before and during therapy, such as the measured amount of exercise required to induce an attack of angina pectoris or changes in the electrocardiogram following exercise, have any supplementary value in the present study?

DR. L. N. KATZ, Chicago: We did not have the unpleasant side effects mentioned by Dr. de Takats when he used smaller doses. In some patients sweating did occur but was not too unpleasant. Constipation occasionally occurred but could be controlled readily with ordinary means. We were impressed with the absence of side effects. No withdrawal symptoms were encountered. It is true that many patients like the drug and asked for its continuation, but these requests were on the same basis as requests for digitalis and other drugs which the patients considered benefited them. When told that no more drug was available, they did not complain or show any symptoms of withdrawal. Similar reports have appeared previously in the literature. Papaverine, therefore, is not habit forming. We made no attempt to analyze the electrocardiographic changes induced by papaverine aside from its effect on the arrhythmias. Precordial pain is a symptom not necessarily related to any specific electrocardiographic alterations. An effect on pain need not parallel an effect on the electrocardiogram and vice versa, and we were interested in its action on anginal pain. There is no contraindication to the use of papaverine with or following digitalis. We have used papaverine after digitalis and we have also used it with quinidine. I know of no pharmacologic or clinical contraindications for such combined uses. We did not believe it worth while to study the effect of papaverine on exercise tolerance, since in our hands the induction of anginal pain with exercise was found to be unreliable quantitatively. We felt that more information could be obtained from the reaction of the patient to his daily activity than from any set exercise test provided the data were cautiously interpreted.

Observations on Shock

DR. L. N. KATZ, R. ASHER and DR. SAMUEL PERLOW, Chicago: We have been able to produce shock in dogs, with fatal termination, by nearly complete venous occlusion of one hind limb. This offers a simple way of studying the course of shock and the utility of some of the proposed therapeutic agents to counteract it. In our control series of 18 dogs, 16 died in shock in three and one-half to twenty-one hours following the venous occlusion. All showed a definite drop in blood pressure, a rise in hematocrit and an increase in the occluded limb size amounting to 2.3 to 6.9 per cent of the body weight. The extensive loss of fluid into the occluded leg is the primary mechanism of this type of shock.

The effect of the following drugs on this type of shock was noted: (*a*) desoxycorticosterone acetate, (*b*) adrenal cortex extract and (*c*) paredrine hydrobromide.

Eleven dogs were treated with desoxycorticosterone acetate for twenty-four hours preoperatively and twenty-four hours postoperatively. Eight of these 11 "primed" dogs survived. The blood pressure showed no appreciable changes; the hematocrit was high during the early postoperative hours but subsequently returned to normal levels, some dogs developing a hemodilution. Although the occluded limb became edematous, its average increase was not as great as those of the control series.

In 9 other dogs 3 received desoxycorticosterone acetate beginning two hours after the occlusion and continued for twelve hours, while the other six received desoxycorticosterone acetate ten minutes to two and one-half hours preoperatively and during the first twelve postoperative hours. Of this group 7 died in shock, 1 of pneumonia and only 1 survived. The postoperative picture was almost identical with the control group.

Adrenal cortex extract was administered to 12 dogs, twelve hours preoperatively and during the first twelve postoperative hours. Of this series 6 survived, 5 died in shock and 1 of bronchopneumonia. Our results show that adrenal cortex extract tends to reduce the amount of fluid lost into the occluded limb, an action more striking than that of desoxycorticosterone acetate alone.

Paredrine showed no beneficial effects when administered to a group of six dogs. The drug was given postoperatively only. All animals died in shock within eleven hours following the operation.

In a group of 13 dogs we attempted to prevent the fluid accumulation into the occluded limb by mechanical means. Following the operation a rigid plaster cast was applied to both lower limbs, the groin and the lower abdomen. This cast was removed thirty-six hours later. Eleven of these animals survived; 1 died in shock and 1 of bronchopneumonia. No hemoconcentration occurred; the blood pressure showed no significant changes and the occluded limb was not edematous. However, edema did develop gradually after removal of the cast but had no deleterious effect on the animals. The absence of shock in this group of dogs emphasizes the fact that local accumulation of fluid determines this state not so much by the amount of plasma fluid lost but rather by the rate at which it is lost. This simple method of preventing shock, caused by fluid loss, has practical application both in civil and in military practice.

DISCUSSION

DR. HEINRICH NECHELES, Chicago: I wonder whether the assumption of the authors that collaterals form is correct, because a traumatized leg will swell up to the limits permitted by the bandage. I think the same pressure on capillaries exists when one permits the leg to swell until the skin would limit further swelling. I do not think collaterals would form under any one of these conditions. Would not some other mechanism, like thrombosis, explain the phenomenon?

DR. GEZA DE TAKATS, Chicago: Would it not be simpler to use a snug wide rubber bandage instead of a cast? Undoubtedly the leg swells a great deal and if one puts on a cast there might be necrosis. I wonder if the authors have made observations with an Esmarch bandage; also if they have made any observations on renal involvement, and whether they believe the entire picture is due to a fluid loss or to toxic substances which produce a hepaticorenal syndrome.

DR. L. N. KATZ, Chicago: There was no question in our minds that collateral veins do develop. Otherwise there is no way of explaining the disappearance of edema in the leg with occluded veins in the animals that survived. We had contemplated the use of a rubber stocking instead of the cast for these dogs, but this would have been less convenient and we were primarily interested in the principle of preventing edema formation, which could readily be accomplished with a cast. We have not yet made observations on renal involvement in this form of shock. As to the action of toxic substances absorbed in the blood stream, I do not know whether they are involved in inducing other forms of shock. However, it would appear that in shock produced by venous occlusion such toxic substances are apparently not involved, nor are neurogenic stimuli. The role of toxic substances and neurogenic stimulation are still the subject of polemics just as they were in the last war and still may be after this war is over. All the evidence tends to show that oligemia and a decreased venous return to the heart leading to a slowing in the circulation to vital parts of the body is the important mechanism involved in shock. The secondary effects resulting from this should be intensively studied, since they lead to the irreversibility of shock.

Production of Experimental Shock in Dogs by Use of Venous Tourniquets

DR. CHARLES C. SCOTT and E. BROWN ROBBINS, B.S., Indianapolis: By applying pneumatic venous tourniquets to both thighs of dogs, swelling results accompanied by fall in blood pressure and reduction of blood volume. The shock which subsequently develops has the following characteristics: (1) It is irreversible without transfusion therapy, (2) the degree of shock in each animal can be adjusted at will, (3) hemorrhage and infection are eliminated as factors and (4) complete recovery of the animal can occur with treatment.

From a series of 78 dogs a formula has been developed which makes possible the accurate determination of the duration of tourniquet application necessary in the individual animal to produce irreversible shock. The calculation is made during each experiment and depends on the degree of blood pressure fall

plus the length of time the tourniquets are applied. Thus the depth of shock can be controlled.

Plasma and solutions of gelatin and pectin have been used successfully as treatment for this type of shock.

Use of Concentrated and Normal Plasma in Shock

DR. R. E. WESTON, DR. S. O. LEVINSON, MARTHA JANOTA, M.S., and DR. HEINRICH NECHELES, Chicago: Shock was produced by graded bleeding in unanesthetized normal or dehydrated dogs. The severity of shock and the response to therapy were evaluated by the animal's general condition, circulating time, hematocrit, plasma volume, blood pressure, and arterial carbon dioxide content. Equal numbers of shocked animals in each group were infused either with normal (4-5 per cent) or with concentrated (15-20 per cent) canine plasma protein solutions. All animals received an equivalent amount of protein, the only difference between the two types of infusions being the total fluid volume.

Generally following infusion, there was an improvement in blood pressure, circulating time, plasma volume and arterial carbon dioxide content. However, the response of the animals, both normal and dehydrated, receiving normal infusions was distinctly superior to that of those receiving the concentrated material, as shown by the more rapid and more pronounced clinical response. Furthermore, the blood pressure was better maintained subsequently when additional blood was withdrawn.

The arterial carbon dioxide gave the best index of the animal's condition after bleeding or infusion. Often although blood pressure, circulating time and plasma volume would return to normal levels, the carbon dioxide failed to rise above 10-25 per cent, and the animal would later die.

Despite an increase in plasma volume, the animals receiving concentrated solutions failed to survive as long as those receiving normal infusions. Apparently the gain in circulating intravascular fluid is at the expense of the extravascular and perhaps intracellular water with added damage to tissues already injured by oligemia and anoxia. In addition, rapidly infused concentrated solutions seemingly overburdened the heart, for during and shortly after such infusions there often occurred a transient drop in the diastolic blood pressure and a bradycardia.

The state of hydration was important in determining the ability of an animal to withstand shock and respond to therapy. The dehydrated animals developed severe shock more rapidly than did the normal animals, and their response to therapy, particularly with concentrated solutions, was definitely inferior to that of the normal animals.

DISCUSSION

DR. HEINRICH NECHELES, Chicago: When a dog or human being loses blood there is usually not hemoconcentration but hemodilution. The body tries to compensate for the loss of fluid and extracts available fluid wherever it can get it. Studies on dehydrated dogs subjected to hemorrhage have shown that available fluid decreases significantly. What happens when dehydrated dogs or human beings receive concentrated plasma or other concentrated colloidal solutions? They have to mobilize additional fluid in order to restore osmotic equilibrium of the blood. I believe, though we have no proof yet, that death may be due to dehydration of vital centers like the heart, kidney and centers of the brain. Another observation that we have made during these experiments is that with concentrated plasma, which contains large amounts of citrate, we may produce tetany. Concentrated plasma should not be used in cases that are dehydrated or in progressed shock. That brings up the advisability of using concentrated plasma in the armed forces. If we would have to transport double distilled water anyway, I wonder whether we should not use isotonic serum or plasma to begin with.

DR. ELMER L. DEGOWIN, Iowa City: As some know, there is a controversy in this country among several groups of workers whether to use isotonic or concentrated plasma in the treatment of shock. The results of these experiments confirm observations made in England in the treatment of shock occurring in air raid casualties. I think there is no doubt from the evidence here presented and the work of others that isotonic solutions are better than are concentrated solutions. One word of explanation is required in view of the fact that soon there will be available to the armed forces a concentrated solution of serum albumin for the treatment of shock. It has been realized that this is a compromise to conserve space, and directions on the packages of this product definitely emphasize the need for administering fluids either parenterally or by mouth to the patients who are under treatment.

DR. R. E. WESTON, Chicago: It should be mentioned that at a recent meeting in New York Dr. C. P. Rhoads stated that the Committee on Blood Substitutes felt that hypertonic plasma solutions should be used with circumspection, particularly when dehydration is suspected. He contrasted the condition of the well hydrated patient in a hospital bed with that of the wounded soldier on the field of battle; not only is the latter often dehydrated before injury, but he loses additional fluid from his bleeding wounds and from vomiting. It is true that, in supplying blood substitutes for the armed forces, a compromise must be struck between the space allotted for storage of materials and the therapeutic efficiency of the materials used. But the ultimate consideration must be adequate and proper treatment for the wounded personnel. Consequently we should have more use of isotonic plasma protein solutions and less use of concentrated materials in the treatment of war casualties.

Experimental Studies on Burns

WILLIAM H. OLSON and DR. HEINRICH NECHELES, Chicago: In previous work gastric motility was found greatly increased in most animals following body burns. Section of the vagus and splanchnic nerves did not affect this motility, but injection of atropine abolished it, suggesting at first that changes in the acetylcholine-esterase system might have occurred. Studies of the blood esterase of burned animals revealed no change.

An outstanding characteristic of burns is their immediate pressor effect on blood pressure in most experiments. A fall in blood pressure during the burn occurs rarely in a normal animal. This pressor effect appears to be due largely to vasoconstriction that causes a rise in blood pressure, although a severe loss in blood volume has occurred. These animals, although their blood pressure was relatively high, did not tolerate withdrawal of single or repeated small blood samples and often responded to this with a precipitous fall of blood pressure and even death. These animals with more or less normal or even high blood pressures were definitely in a state of shock, as shown by a high degree of concentration of the blood, low blood carbon dioxide (acidosis) and slow circulating time. One of the mechanisms responsible for this sustained blood pressure following burns may be the posterior pituitary gland, because we have been able to abolish the rise or maintenance of blood pressure following burns by hypophysectomy. Following this operation, blood pressure fell following burns, as is usually observed following traumatic shock.

The clinical application of these studies is that small doses of atropine should be given to all burned patients in order to avoid vomiting, ulceration of the stomach and so on. Secondly, blood pressure readings in burned patients may be misleading, and a normal or high reading may mask severe shock.

DISCUSSION

DR. HEINRICH NECHELES, Chicago: We have done other experiments that Mr. Olson could not report. It is known from the fine experiments done at the Peking Union Medical College that there is a reflex afferent mechanism to the posterior pituitary gland. When this is interrupted, stimulation of sensory nerves will not be followed by an output of pressor substances and a rise in blood pressure. Therefore we have cut the pituitary stalk or the posterior lobe or performed total pituitectomy and have found that following this burns did not produce a rise in blood pressure. If we traumatize a limb we always see a drop in blood pressure. The pressor mechanism of burns seems to play quite a role in maintaining blood pressure until the animal dies, usually suddenly, at a level of blood pressure that may be called normal. At the same time other determinations indicated a serious physical condition of the animal, although the blood pressure was near normal. Pituitectomy may interfere with the capillary circulation, and consequent effects of burns may have nothing to do with the usual homeostatic mechanisms in shock. That remains to be shown. I believe we are dealing in part with a nervous and in part with a hormonal mechanism which both maintain or raise blood pressure in burns.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1932 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Review of Tuberculosis, New York

47:1-112 (Jan.) 1943

Development of Tuberculosis in the Apparently Healthy Adult. A. B. Robins, New York.—p. 1.
*Disappearance of Tuberculin Reaction in Children Under Treatment for Allergies. F. M. Pottenger Jr. and F. M. Pottenger, Monrovia, Calif. —p. 11.
*Tuberculin Sensitivity and Development of Tuberculosis in Nurses. S. Schwartz, New York.—p. 19.
Treatment of Tuberculosis with Promin: Progress Report. H. C. Hinshaw, Rochester, Minn.; K. Pfuetze, Cannon Falls, Minn.; and W. H. Feldman.—p. 26.
*Pleural Effusions in Pulmonary Tuberculosis: Clinicopathologic Study. B. Gordon, R. Charr and J. W. Savacool, Philadelphia.—p. 35.
Tuberculin Reaction in Old Age. P. Amazon, Brooklyn.—p. 41.
Ulcerative Tuberculosis of Stomach. P. H. Hartz and A. van der Sar, Curaçao, Netherland West Indies.—p. 46.
Pentothal Sodium Anesthesia for the Tuberculous Patient. V. R. Krueger, Nopeming, Minn.—p. 51.
Oxygen Therapy in Chronic Suppuration of Lung: Report of 8 Cases. A. E. Johnson and A. Cournand, New York.—p. 56.
Electrophoresis of Serum: Serum Proteins in Tuberculosis and Other Chronic Diseases. Florence B. Seibert and J. W. Nelson, Philadelphia.—p. 66.
*Experimental Pulmonary Tuberulosis in Dog: Reinfection. F. D. Gunn, M. A. Mills, C. C. Shepard and E. E. Barth, Chicago.—p. 78.
New Derivatives of Diaminodiphenysulfone: Their Therapeutic Effect in Experimental Tuberculosis of Guinea Pigs. F. F. T. Callomon, with technical assistance of Loraine Groskin, Philadelphia.—p. 97.

Waning of Tuberculin Allergy.—The Pottengers encountered 41 children whose tuberculin reactions changed from positive to negative while they were under treatment for bronchial asthma, hay fever and chronic bronchitis. They all were positive to the first dose of purified protein derivative at the beginning of treatment and, while under treatment, failed to react to a subsequent similar dose and in some instances to the second dose of purified protein derivative. The positive reaction of 1 other patient became negative and again positive; this shows a decided lability in the reaction. A reaction was not considered positive unless there was erythema and the induration was at least 0.5 cm. in diameter. In the children who failed to react on the repetition of the first dose of purified protein derivative it must be assumed that the effect must have been brought about by improving the patient's physiologic mechanism, which was probably done by changing his chemical and physical tissue reactions. If a larger amount of tuberculin had been used a reaction might have been brought about. The instability of the tuberculin reaction (allergic) may be important in explaining the fact that a certain proportion of people who do not react to the first dose of purified protein derivative will react to the second dose. It is probable too that the time when the dose is given is important in the reaction. The adrenal cortex produces substances which have an antiallergic effect, and diet increases resistance. Resistance is physiologic, and immunity is an exaggeration of the normal physiologic mechanism. Both diet and the adrenal cortex were probably factors in the phenomena reported.

Tuberculosis in Nurses.—An analysis of the sensitivity to tuberculin and the later history of 270 nurses who were affiliated with the Trudeau Sanatorium from 1936 to September 1941 is discussed by Schwartz. On arrival, all graduate nurses and 77 per cent of the students were positive to 10 mg. or less of tuberculin. Of the nonreacting student nurses 25 per cent became positive by the end of their affiliation. Relapse has occurred in 1 of the 10 graduate and 3 of the 6 student nurses who had pulmonary tuberculosis on arrival at the sanatorium. Lack of a previous period of treatment seemed to be the chief factor coincident with relapse among the students. In none of the graduate nurses but in 3.6 per cent of the tuberculin negative and 2.3 per cent of the tuberculin positive student nurses who had no demonstrable pulmonary disease on entrance did pulmonary tuberculosis develop later. The reactors in whom lesions developed were originally relatively insensitive to tuberculin.

Pleural Effusions in Pulmonary Tuberculosis.—The pleural effusions investigated by Gordon and his co-workers in 80 selected cases (35 at necropsy) were studied with special reference to their pathogenesis and the mechanical factors favoring progression. From the pathologic changes, which in a measure explain the clinical manifestations, it is evident that the greatest number of cases of pleural effusion complicating pulmonary tuberculosis were directly associated with extension of subpleural tuberculous lesions and that the formation of the fluid was the precursor of serious complications, even though the amount of fluid was insignificant. The more acute the tuberculous process, the more frequently was effusion a complication. The more chronic and proliferative were the tuberculous lesions, the less often and the less serious was the effusion. There was no instance of pleural fluid in pneumonoconiosis complicating tuberculosis; a possible explanation for this is the tendency of pulmonary fibrosis to hold the tuberculous process in abeyance. The age of the patient had no definite bearing. However, in young patients with chronic and fibrotic lesions fluid seldom developed, and when it did it was nonpurulent though tuberculous. Sulfadiazine has been of value in controlling superimposed pyogenic infection of the fluid. Quinine and urea hydrochloride used as a sclerosing agent aids in obliterating residual pleural spaces and pleurocutaneous sinuses.

Experimental Pulmonary Tuberculosis.—Gunn and his collaborators studied observable differences between infection with virulent tubercle bacilli by the bronchial route into the pulmonary parenchyma in previously infected and in primarily infected dogs. Hypersensitivity to tuberculoprotein appeared in most of the dogs within a few weeks after intrabronchial or intratesticular injection of virulent tubercle bacilli. The maximal cutaneous allergy was usually reached within sixty days. When the first dose of human or bovine type bacilli was relatively small (1 mg. or less) the primary lesion usually healed completely with cicatrization, but hypersensitivity persisted for a year or longer after healing was complete. Reinfection with an equal or larger dose of virulent bacilli, introduced intrabronchially three to twelve months after the first infection, resulted in a pulmonary lesion which did not differ significantly in size, composition or ultimate outcome from the primary lesion; that is, there was no morphologic evidence of a "primary type" and "reinfection type" of tuberculous lesion. Caseation, calcification, cavity formation and fibrosis did not differ appreciably in the pulmonary lesions of primary infection from those of reinfection, but there was a greater tendency for caseation to occur in the regional lymph nodes of the primary complex. Differences in natural (inherited) resistance to tuberculosis and differences in the size of the dose appeared to influence the results to an important degree but, under the conditions of the experiments, the effects of acquired specific immunity and hypersensitivity were comparatively insignificant.

Archives of Ophthalmology, Chicago

29:171-340 (Feb.) 1943

Aging Process in Eye and Adnexa. C. Berens, New York.—p. 171.
Developmental Cataracts: Results of Surgical Treatment in 131 Cases. H. F. Falls, Ann Arbor, Mich.—p. 210.
Contact Roentgen Therapy of Superficial Malignant Lesions About Eye. W. E. Howes and M. R. Camiel, Brooklyn.—p. 224.
Thrombophlebitis of Cavernous Sinus: Review of Reported Recoveries, with Special Reference to Thrombophlebitis of Staphylococcic Origin. W. J. MacNeal, Frances C. Frisbee and Anne Blevins, New York. —p. 231.
Congenital Bilateral Anophthalmos Vera with Unilateral Polydactyly and Cleft Palate: Report of Case. A. Appelbaum; and M. Marmelstein, Carbondale, Pa.—p. 258.
Role of the Medical Social Worker in Ophthalmologic Service. Mabel Lee Price, Philadelphia.—p. 266.
pH and Tonicity of Ophthalmic Solutions. N. C. Elvin, Brooklyn.—p. 273.
Kodacolor Fundus Prints: New Technic. D. W. Bogart, New York.—p. 278.
Viruses and Virus Diseases of Eye: I. Properties and Nature of Viruses. P. Thygeson, New York.—p. 285.

Archives of Surgery, Chicago

46:167-306 (Feb.) 1943

*Effects of Lowering Temperature of Injured Extremity to Which a Tourniquet Has Been Applied. A. Blalock, Baltimore.—p. 167.
Deleterious Effects of Anoxia on Liver of Hyperthyroid Animal. M. A. McIver and Eleanor A. Winter, Cooperstown, N. Y.—p. 171.
Delayed Splenic Rupture: Clinical Syndrome Following Trauma: Report of 4 Cases with Analysis of 177 Cases Collected from Literature. E. J. Zabinski and H. N. Harkins, Detroit.—p. 186.
Inorganic Phosphorus Content of Serum in Shock. G. W. Duncan, Baltimore.—p. 214.
Clot Resistance in Mice and Mechanism of Hemostasis. J. J. Lalich, Kansas City, Kan., and A. L. Copley, New York.—p. 224.
Surgical Anatomy of External Carotid Plexus. E. Gardner, Stanford University, Calif.—p. 238.
Free Graft Over Vitallium Tube for Bridging Gap in Common Bile Duct of Dog. J. W. Lord Jr. and A. I. Chenoweth, New York.—p. 245.
Operative Treatment of Cancer of Large Bowel Without Colostomy. W. W. Babcock and H. E. Bacon, Philadelphia.—p. 253.
Traumatic Hemorrhage of Internal Capsule. A. Angrist and N. Mitchell, Jamaica, N. Y.—p. 265.
*Total Circulating Plasma Proteins in Surgical Patients with Dehydration and Malnutrition: Indications for Intravenous Alimentation with Amino Acids. W. E. Abbott, Cleveland, and R. C. Mellors, Baltimore.—p. 277.
Anatomic Study of Venous Variations at Fossa Ovalis: Significance of Recurrences Following Ligations. S. T. Glasser, New York.—p. 289.
Intravenous Use of Vitamin K_1 Oxide. W. A. Davis, H. A. Frank, A. Hurwitz and A. M. Seligman, Boston.—p. 296.
Concentration of Procaine in Cerebrospinal Fluid of Human Being After Subarachnoid Injection: Third Report. H. Koster, Brooklyn.—p. 301.

Application of Tourniquet to Extremity.—Blalock's experiments to determine the systemic effects of the use of a tourniquet on an injured extremity reveal that its use should be avoided whenever possible but that, if constriction is necessary, the temperature of the distal ischemic and anemic part should if possible be lowered by artificial means.

Circulating Plasma Proteins in Dehydration and Malnutrition.—Abbott and Mellors demonstrated that severe dehydration may exist even though vomiting has not occurred or has been minimal. They used unselected patients with carcinoma of the gastrointestinal tract or pyloric stenosis due to ulcer who had shown a moderate loss of weight and a diminished intake of food and fluid. Normal hematocrit values (erythrocyte counts and hemoglobin concentrations) and plasma protein concentrations may be obtained when dehydration is accompanied by malnutrition. In such conditions not only the plasma proteins but also the tissue proteins should be replenished. If adequate calories cannot be consumed orally, intravenous or intrasternal alimentation should be resorted to. Adequate amounts of amino acids, parenterally, will maintain a positive nitrogen balance when sufficient calories are given, and thus an increase in the total circulating plasma proteins can be obtained.

Cancer Research, Baltimore

3:73-144 (Feb.) 1943

Metabolism of Normal and Tumor Tissue: XX. Comparison of Metabolism of Tumors of Liver and Skin with That of Tissue of Origin. F. Dickens and H. Weil-Malherbe, Newcastle on Tyne, England.—p. 73.
Studies in Esterase (Butyric) Activity: II. Esterase Content of Livers of Mice and Its Excretion in Strains Susceptible or Insusceptible to Mammary Cancer. R. G. Chitre and V. R. Khanolkar, Bombay, India.—p. 88.
Testicular Tumors in Mice of Several Strains Receiving Triphenylethylene. W. U. Gardner, New Haven, Conn.—p. 92.
Possible Carcinogenicity of Overcooked Meats, Heated Cholesterol, Acrolein and Heated Sesame Oil. P. E. Steiner, R. Steele and F. C. Koch, Chicago.—p. 100.
Diet and Epithelial Hyperplasia in Forestomach of Rats and Mice. G. R. Sharpless, Detroit.—p. 108.
Irradiated Benzpyrene and Inhibition of Urease Activity. G. C. Mueller and H. P. Rusch, Madison, Wis.—p. 113.
Effect of *p*-Dimethylaminoazobenzene on Formation of Blood Proteins. B. E. Kline, Madison, Wis.—p. 117.

Connecticut State Medical Journal, Hartford

7:79-148 (Feb.) 1943

Intelligent Gynecologic Examination. G. G. Ward, New York.—p. 81.
Management of Patient with Subarachnoid Hemorrhage. W. J. German, New Haven.—p. 88.
Summary of Endocrine Effects in Advanced Prostatic Cancer. C. Huggins, Chicago.—p. 90.
Chemotherapy in Bacteremias. M. Finland, Boston.—p. 92.
Sympathoblastoma in Newborn: Case Report. M. R. Moore and G. H. Gildersleeve, Norwich.—p. 101.
Periarteritis Nodosa: Brief Review and Case Report. W. Finkelstein and P. J. Brennan, Waterbury.—p. 104.

Journal of Bone and Joint Surgery, Boston

25:1-242 (Jan.) 1943. **Partial Index**

*End Results of Bloodless Reduction of Congenital Dislocation of Hip. B. Gill, Philadelphia.—p. 1.
*Role of Sulfonamide Drugs in Treatment of Hematogenous Osteomyelitis. J. C. Wilson and F. M. McKeever, Los Angeles.—p. 41.
Thoracic Spine Fusion: Method. F. vom Saal, New York.—p. 49.
*Flexion Treatment for Low Back Pain: Indications, Outline of Conservative Management and New Spine Fusion Procedure. L. W. Breck and W. C. Basom, El Paso, Texas.—p. 58.
Spondylolisthesis: Surgical Treatment and Results. H. W. Meyerding, Rochester, Minn.—p. 65.
Nicola Operation for Posterior Subacromial Dislocation of Humerus. H. May, Philadelphia.—p. 78.
Full Active Abduction in Traumatic Paralysis of Deltoid. O. S. Staples and A. L. Watkins, Boston.—p. 85.
Paravertebral Abscesses Associated with Strümpell-Marie Disease. A. Oppenheimer, Laconia, N. H.—p. 90.
Tibial Collateral Ligament: Its Function, Its Bursas and Its Relation to Medial Meniscus. O. C. Brantigan and A. F. Voshell, Baltimore.—p. 121.
Results of Poliomyelitis in Baltimore. R. E. Lenhard, Baltimore.—p. 132.
Rotation Osteotomy of Ulna for Pronation Contracture of Forearm. H. Milch, New York.—p. 142.
Intertrochanteric Fractures: Nonoperative, Castless and Ambulatory Method of Treatment. R. Anderson, W. B. McKibbin, Seattle, and E. Burgess, Vancouver, Wash.—p. 153.
Paralytic Pelvic Obliquity: Transplantation of Origin of Hamstring Muscles to Symphysis Pubis. P. M. Girard, Dallas, Texas.—p. 169.
Zinc Peroxide: Valuable Adjunct in Treatment of Gas Bacillus Infection and Traumatic Wounds. F. K. Holzwarth, Rochester, N. Y.—p. 177.
March Fractures. H. E. Sweet and W. H. Kisner, Camp Croft, S. C.—p. 188.
Etiologic Possibilities of March Fractures. E. Berkman, Camp Lee, Va.—p. 206.

Congenital Dislocation of Hip.—Gill has encountered 204 female and 49 male patients with congenital dislocation of the hip; 69 had bilateral dislocations. The dislocations of 206 were reduced bloodlessly. There were 4 patients with bilateral dislocations in whom reduction was not attempted because of extreme malformation and other congenital deformities. After all patients with faulty or incomplete records are excluded there remain 126 whose hips were bloodlessly reduced. The percentage that remained reduced after one, two, three, four, five, six and seven, eight or nine years was respectively 17.5, 43.7, 35, 26.2, 22, 21.4 and 11.9. The successive percentages are progressively lower, for during the nine years 63 patients disappeared from the clinic or their result was undetermined. However, the result in these 63 cannot be considered a failure as in many the result was perfect, excellent, good or satisfactory when they were last seen. The percentages are therefore only relative. During the nine years 48 were operated on because of redislocation and 9 were not operated on. The hips of 12 were reduced by manipulation. In 2 the result in both hips (followed ten years) was perfect, in 3 (followed thirteen to twenty-seven years) one hip remained reduced and became perfect, while the other hip became redislocated and was operated on. Thus the result in seven of twenty-four hips was perfect. The author in the past has advocated an acetabuloplasty (shelf operation) as soon as a hip redislocated or when open operation was necessary. More recent observations have led him to delay such an operation, if possible, until the fifth year, in the meantime maintaining the limb in abduction in a plaster cast or brace to preserve the relation of the head of the femur to the socket. Failure of the operation at an early age may be due to the fact that the acetabular roof is largely cartilaginous, and the operative procedure damages its blood supply and prevents its conversion into bone. This resorption of the shelf, or buttress, has not been observed in patients more than 5 years of age. In forty-two extracapsular-buttress operations, observed for three to twenty years after operation, there were only four poor results. Periodic roentgen study alone can indicate the ultimate success or failure of the operation. Bloodless reduction has resulted in normal function for 16.7 per cent of the patients and for 30 per cent of those whose end result for eight and more years was known.

Sulfonamide Drugs in Hematogenous Osteomyelitis.—Wilson and McKeever studied the influence of the sulfonamides on hematogenous acute osteomyelitis in 31 consecutive children entering the Los Angeles Children's Hospital from January 1939 to December 1941. The greatest effect of the sulfonamides

was on the infected blood stream, which was usually promptly sterilized. The incidence of death and of multiple involvement of the bone was reduced by routine sulfonamide therapy. An occasional patient with mild acute hematogenous osteomyelitis may recover with chemotherapy alone. Well timed surgical drainage of abscesses and pyogenic granulomas is not supplanted by chemotherapy in the treatment of acute osteomyelitis, and it should never be assumed that recovery may or will result without drainage.

Flexion Treatment for Low Back Pain.—A review of the literature suggested to Breck and Basom that flexion treatment of low backache due to a narrowed lumbar disk, regardless of whether the pain is due to a protruded disk or subluxation of the lumbosacral or lumbar facets, is sound. Conservative flexion treatment utilizing new apparatus has been found efficient for home treatment. A new spine fusion procedure, using a mortised interspinous bone block, has been successful in restoring the intervertebral interspace to normal, in reducing accompanying subluxation and in giving internal fixation to routine spine fusion grafts.

Journal of Clin. Endocrinology, Springfield, Ill.

3:1-70 (Jan.) 1943

Thyroidal Action of Synthetic Thyroprotein. E. P. Reineke and C. W. Turner, Columbia, Mo.—p. 1.
Effects of Various Thyroid Substances in Patients with Obesity. S. W. Kalb, Newark, N. J.—p. 7.
Treatment of Gigantism: Observations on Pituitary Giant for Six Years. L. M. Hurxthal, Boston.—p. 12.
*Use of Adrenal Extract in Fever Therapy. A. Edelmann, D. L. Mahanna, L. A. Lewis, J. S. Thatcher and F. A. Hartman, Columbus, Ohio.—p. 20.
Diabetes Mellitus Without Other Endocrine Manifestations in a Case of Tumor of Adrenal Cortex. R. G. Sprague, J. T. Priestley and M. B. Dockerty, Rochester, Minn.—p. 28.
Control of Diabetes Mellitus. H. J. John, Atlanta, Ga.—p. 33.
Endocrine Aspects of Hypertension. M. A. Goldzieher and S. Salmovitz, New York.—p. 37.
Comparison of Methods Used in Determining Time of Ovulation. F. E. D'Amour, Denver.—p. 41.

Adrenal Extract in Fever Therapy.—Edelmann and his co-workers tried to determine the underlying factors that caused adrenal extract to alleviate or reduce the severity of many of the ill effects (weakness, nausea, vomiting and herpes) of hyperpyrexia. The 12 subjects studied were suffering from syphilis of the central nervous system. They were treated once a week for ten weeks. Adrenal extract 6 cc. was injected intramuscularly immediately after the first sample of blood was withdrawn and 4 cc. after the patient was removed from the cabinet; during control periods placebos were injected. It appeared that adrenal extract prevented or reduced the fall in plasma sodium in some instances, had no effect on plasma potassium and may or may not have affected the plasma chloride. It appeared to have a decided effect in reducing fatigue and the rate of recovery after one or two treatments. If the results of five treatments with extract and the five without extract of each patient are averaged, it is seen that the reaction is improved with extract. This was true whether the extract was used in consecutive or in alternate treatments. The first two fever treatments were tolerated better than subsequent treatments without extract. Although extract favorably affects fatigue and recovery the first time it is used, its effect is greater in subsequent treatments. The blood sugar fell in every instance in which it was determined when extract was not administered. When either extract or desoxycorticosterone was given, the blood sugar rose somewhat. Extract caused a reduction in the concentration of sodium in the sweat. The total potassium excreted was reduced in some instances when extract was given. The results with total chloride were similar to those with total sodium. There were no significant variations in total protein, albumin, globulin and fibrinogen. The frequency and intensity of the other ill effects were also favorably affected. Desoxycorticosterone acetate had no beneficial effect. The retention of sodium when adrenal extract was given was insufficient to account for the amelioration of the unfavorable clinical reactions to fever therapy. It is suggested that extract may act on the central nervous system.

Journal of Experimental Medicine, New York

77:97-194 (Feb.) 1943

Immunologic and Electrophoretic Comparison of Antibody to C Polysaccharide and C Reactive Protein of Acute Phase Serum. E. Perlman, J. G. M. Bullowa and Ruth Goodkind, New York.—p. 97.
Swine Lungworm as Reservoir and Intermediate Host for Swine Influenza Virus: III. Factors Influencing Transmission of Virus and Provocation of Influenza. R. E. Shope, Princeton, N. J.—p. 111.
Id.: IV. Demonstration of Masked Swine Influenza Virus in Lungworm Larvae and Swine Under Natural Conditions. R. E. Shope, Princeton, N. J.—p. 127.
Complement Fixation with Neurotropic Viruses. W. P. Havens Jr., D. W. Watson, R. H. Green, G. I. Lavin and J. E. Smadel, New York.—p. 139.
LS Antigen of Vaccinia: III. Physical Chemical Properties of LS Antigen and Some of Its Degradation Products. T. Shedlovsky, A. Rothen and J. E. Smadel, New York.—p. 155.
Id.: IV. Chemical Analysis of LS and Effect of Chymotrypsin on LS. J. E. Smadel, C. L. Hoagland and T. Shedlovsky, New York.—p. 165.
Effect of Salicylates on Precipitation of Antigen with Antibody. A. F. Coburn and Eleanor M. Kapp, New York.—p. 173.
Allergenic Relationship of Pollens of Dwarf and Giant Ragweed to Several of Their Botanic Relatives. F. A. Simon, Louisville, Ky.—p. 185.

Journal of Nat. Cancer Inst., Washington, D. C.

3:227-348 (Dec.) 1942

Induction of Leukemia in Mice by Methylcholanthrene and X-Rays. D. P. McEndy, Mary C. Boon and J. Furth.—p. 227.
Metabolism of Induced and Spontaneous Leukemias in Mice. D. Burk, H. Sprince, Juliet M. Spangler, Mary C. Boon and J. Furth.—p. 249.
Action of 5, 9, 10-Trimethyl-1, 2-Benzanthracene on Skin of Mouse. J. L. Hartwell and H. L. Stewart.—p. 277.
Creatine and Creatinine Content of Transplanted Hepatomas and of Normal and Regenerating Liver. J. P. Greenstein.—p. 287.
Incubation of Citrulline and Ammonia with Normal and Neoplastic Hepatic Tissues. J. P. Greenstein.—p. 293.
Induction of Carbon Tetrachloride Hepatoma in Strain L Mice. J. E. Edwards, W. E. Heston and A. J. Dalton.—p. 297.
Relationship Between Lethal Yellow (A^y) Gene of Mouse and Susceptibility to Induced Pulmonary Tumors. W. E. Heston.—p. 303.
Technic Suitable for Quantitative Studies on Mammary Tumor Inciter of Mice. H. B. Andervont, M. B. Shimkin and W. R. Bryan.—p. 309.
Cytology of Hepatic Tumors and Proliferating Bile Duct Epithelium in Rat Induced with *p*-Dimethylaminoazobenzene. A. J. Dalton and J. E. Edwards.—p. 319.
Intestinal Adenocarcinoma and Intra-Abdominal Hemangioendothelioma in Mice Ingesting Methylcholanthrene. J. White and H. L. Stewart.—p. 331.

Journal of Pediatrics, St. Louis

22:1-134 (Jan.) 1943

*Studies on Measles: IV. Results Following Inoculation of Children with Egg Passage Measles Virus. J. Stokes Jr., Philadelphia; G. C. O'Neil, Omaha; M. F. Shaffer; G. Rake, New Brunswick, N. J., and Elizabeth P. Maris, Philadelphia.—p. 1.
*Id.: V. Results of Chance and Planned Exposure to Unmodified Measles Virus in Children Previously Inoculated with Egg Passage Measles Virus. Elizabeth P. Maris, Philadelphia; G. Rake, New Brunswick, N. J.; J. Stokes Jr., Philadelphia; M. F. Shaffer; and G. C. O'Neil, Omaha.—p. 17.
Chronic Hemolytic Anemia with Paroxysmal Nocturnal Hemoglobinuria (Marchiafava-Micheli Syndrome): Report of Case with Marked Thrombocytopenia in Five Year Old Child. P. P. Pierce and C. A. Aldrich, Chicago.—p. 30.
Is Breast Milk Adequate in Meeting the Thiamine Requirement of Infants? Elizabeth M. Knott, Sarah C. Kleiger and F. W. Schlutz, with technical assistance of G. Collins, Chicago.—p. 43.
Diagnosis and Evaluation of Compensated and Uncompensated Patency of Ductus Arteriosus. J. P. Hubbard, Boston.—p. 50.
Role of Colon Organisms and Their Toxins in Epidemic Diarrhea of Newborn Infant. W. B. McClure, Toronto, Canada.—p. 60.
*Effect of Sulfathiazole in Treatment of Dysentery in Children. E. Rubens, M. Kaplan, M. P. Borovsky and M. L. Blatt, Chicago.—p. 70.
Vitamin K in Hemorrhagic Disease of Newborn Infant. C. E. Snelling, with technical assistance of Winnifred Nelson, Toronto, Canada.—p. 77.
Assessing the Physical Condition of Children: I. Case Demonstration of Failing Growth and Determination of "Par" by Grid Method. N. C. Wetzel, Cleveland.—p. 82.
The Families of the Child Research Council: Study of Families Whose Children Are Similar to Those in Urban Pediatric Practice. Dorothea Greene Dunlop, Denver.—p. 111.
The Pediatrician and the War: Age as Factor in Susceptibility of Young Workers to Toxic Substances. W. M. Schmidt, Washington, D. C.—p. 121.

Studies on Measles.—Stokes and his colleagues inoculated 250 supposedly susceptible and 5 presumably unsusceptible children with measles virus grown on the chorioallantois of the developing chick embryo for three to sixty-six serial passages. The inoculation was by intranasal drip, inhalation, intradermal

or subcutaneous injection. Typical reactions of extremely mild measles occurred in most of the inoculated children, that is, with Koplik spots, rash, fever, conjunctivitis and coryza but rarely with cough or malaise. Because of the nature of the reactions, the measles virus as inoculated was considered to be modified and to produce an attenuated disease. The passage of the attenuated measles virus again through human beings, from evidence obtained by a single human passage through several "contact control" children, showed that it did not regain its virulence by such passage. There were no significant differences in the reactions to different routes of inoculation, to two different methods of preserving the virus material or to different dilutions of the inoculum.

Studies on Measles.—According to Maris and her colleagues, 22 children who had been previously inoculated with egg passage measles virus were exposed by chance up to one year after their inoculation to children with active measles. Typical measles developed in 3, mild measles in 1, an extremely mild disease distinguishable with difficulty as measles in 3 and no disease in 15. Twenty-four similarly previously inoculated children were exposed by challenging injections of blood from patients with active measles. Typical measles developed in 3, mild measles in 2, an extremely mild disease distinguishable with difficulty as measles in 5, no disease in 13, and 1 child showed a slight nasopharyngitis without fever, rash or Koplik spots. The injection into suitable control children and monkeys of the challenge material caused measles, typical for the species, to develop. The measles virus used gave sufficiently encouraging results to warrant its further trial in larger groups of susceptible children under field conditions. Forty of the 46 children inoculated appeared to be completely or partially protected.

Sulfathiazole in Treatment of Dysentery.—Rubens and his associates used sulfathiazole in the treatment of 17 children who entered the Cook County Children's Hospital because of frequent watery stools containing blood and mucus. There were 29 control children. Sulfathiazole was started from two to four days after the patient's hospitalization and continued until the stools were normal in number, color and consistency and until the cultures of three weekly consecutive stools were negative. The average daily dose of the drug was 1½ grains (0.1 Gm.) per pound of body weight, given in six equal doses at intervals of four hours. Nonspecific, supportive therapeutic measures, as indicated by the clinical condition, were employed. The 8 patients with clinical dysentery from whose stools positive cultures of Bacterium dysenteriae and Salmonella were obtained responded better to sulfathiazole than the 9 clinically identical patients whose stool cultures were negative. The ratio of the duration of disease after treatment was started is two and nine-tenths to four and seven-tenths days. The duration of diarrhea was shorter in the 8 patients after sulfathiazole was started than it was in the 13 similar patients treated identically but without sulfathiazole. The ratio of days of diarrhea after sulfathiazole was started was two and nine-tenths to eight and eight-tenths. Therefore sulfathiazole appeared to have definite value in the treatment of patients whose stool cultures were positive for dysentery or Salmonella organisms, but no statistically significant effect was demonstrable in those whose stools were negative for the organisms.

Kansas Medical Society Journal, Topeka

44:1-36 (Jan.) 1943

Fundamentals of Psychiatry: IV. Types and Classification of Mental Disorders. W. C. Menninger, Topeka.—p. 1.
*Tannic Acid Jelly and Silver Nitrate Dressing for Wounds. M. A. Walker, Kansas City.—p. 5.
Note on Platelet Counting. J. L. Lattimore and Lois Gnagy, Topeka.—p. 6.
Medical Care for the Indigent. R. W. Callahan, Topeka.—p. 8.

Tannic Acid Jelly and Silver Nitrate Dressing for Wounds.—Walker suggests the use of tannic acid jelly and then a 10 per cent solution of silver nitrate as a rapid dressing to simulate the natural scab formed by coagulation and drying of blood and tissue fluid. The method fulfils satisfactorily the requirements of hemostasis, antisepsis, protection, splinting and appearance. The dressing is inexpensive, is easy to apply, may be reinforced by subsequent applications and is particularly useful in sites at which gauze is difficult to apply. Its use would greatly decrease the need for gauze and adhesive tape. The laceration, abrasion excoriation or other similar wound is cleansed, the skin is drawn together if necessary, tannic acid jelly is applied to the wound, the excess is removed after a few minutes and the 10 per cent solution of silver nitrate is applied. The film that results is an entirely satisfactory dressing.

Nebraska State Medical Journal, Lincoln

28:33-64 (Feb.) 1943

*Surgical Relief of Intractable Pain. W. T. Peyton, Minneapolis.—p. 36.
Athletic Injuries. M. H. Hobart, Evanston, Ill.—p. 44.
Atypical Pneumonia of Unknown Etiology: So-Called "Virus Pneumonia." F. Conlin, Omaha.—p. 47.
Diagnosis of Virus Pneumonitis in Infancy. J. L. Gedgoud, Omaha.—p. 51.

Surgical Relief of Intractable Pain.—Peyton states that for the relief of intractable pain at the University Hospitals 59 patients received seventy-eight subarachnoid injections of alcohol between January 1935 and January 1941, 9 had rhizotomies, 5 had tractotomies and 16 had chordotomies performed between July 1937 and January 1941. Unless the relief obtained, whether complete or partial, persisted until death or for at least two months in those surviving that long, the patient was classified as having no relief. Of the 59 patients having subarachnoid injections of alcohol 33 obtained complete relief, 15 partial relief and 11 no relief. Of the 9 in whom rhizotomy was done 7 were completely relieved and 2 had partial recurrence of pain several months after rhizotomy. The 5 patients on whom tractotomy was performed obtained complete relief. A postoperative ataxia of 1 patient disappeared in two weeks. Complete relief was obtained by 81 per cent of the patients having chordotomy for the relief of pain from incurable cancer.

Surgery, St. Louis

13:1-176 (Jan.) 1943

Sympathectomy in Treatment of Peripheral Vascular Disease. H. B. Shumacker Jr., Baltimore.—p. 1.
Measurement of Circulation Rate: Review of Methods. C. J. Bellis, Springfield, Mo.—p. 27.
*Circulation Rate After Operation, with Special Reference to Effect of Position. C. J. Bellis, Springfield, Mo.; A. K. Doss, Fort Worth, Texas, and C. B. Craft, Bozeman, Mont.—p. 35.
Sequelae of Transfixation of Bone. R. Anderson, Seattle, and B. L. Finlayson, Price, Utah.—p. 46.
Resection of Femoral Neck with Pelvic Support Osteotomy for Ankylosis of Hip. H. Milch, New York.—p. 55.
Double Pulley Humeral Adaptation of Russell Traction. D. W. Smith, Miami, Fla.—p. 62.
Intestinal Activity Following Distention of Gallbladder and Urinary Tract: Experimental Study. H. J. Svien and F. C. Mann, Rochester, Minn.—p. 67.
Intestinal Activity After Obstruction of Common Bile Duct. A. Canonico and F. C. Mann, Rochester, Minn.—p. 81.
Effect of Intraperitoneal Injection of Gastric, Strangulated Intestinal and Appendical Loop Content on Leukocyte Count. F. C. Hill and B. J. O'Loughlin, Omaha.—p. 87.
*Treatment of Small Bowel Obstruction: Procedure Used at University of Minnesota Hospitals. C. Dennis and S. P. Brown, Minneapolis.—p. 94.
Penetrating Gunshot and Stab Wounds of Abdomen: Review of 336 Cases. J. E. Hamilton and E. Duncan, Louisville, Ky.—p. 107.
*Conservatism in Surgical Management of Acute Regional Enteritis. H. G. Smithy, Charleston, S. C.—p. 122.
Operative Cholangiography. R. B. Bettman, W. J. Tannenbaum and R. A. Arens, Chicago.—p. 131.
Effect of Ligation of Arteries of Stomach on Acid Gastric Secretion and on Endoscopic Appearance of Gastric Mucosa in Dog. J. A. Layne, Great Falls, Mont., and G. S. Bergh, Minneapolis.—p. 136.
Femoral Hernia: Description of a New Operative Procedure. S. W. Moore, New York.—p. 145.
Acute Subdural Hydroma Simulating Syndrome of Extradural Hemorrhage. M. Scott, Philadelphia.—p. 152.
*Thymus in Myasthenia Gravis: Observations on Normal Anatomy and Histology of Thymus. H. E. Sloan Jr., Baltimore.—p. 154.

Circulation Rate After Operation.—Using the sodium cyanide method, Bellis and his associates determined the cubital to carotid and ankle to carotid circulation time in 191 cases about twenty hours preoperatively and postoperatively. Because the patient seems to respond better to a second stimulus of sodium cyanide than to a first, the response to injection was first determined from one of the cubital veins, and following an interval of five minutes an injection into one of the veins of the ankle was made. In no instance was the patient informed of the response expected. Occasionally the response was associated with symptoms suggestive of motor irritation which last less than a minute; in some slight temporary nausea was present

but no alarming sequela ensued. None of the solution should be injected extravascularly, as local necrosis may follow such an accident. Usually the cubital vein to carotid and ankle vein to carotid time was shortened after major surgery. The average preoperative cubital vein to carotid and ankle vein to carotid body time of the 191 patients was seventeen and thirty-six seconds and the postoperative time was fourteen and thirty-two seconds, respectively. Circulation rates varied widely in patients with apparently normal circulatory systems. Acceleration of the blood flow postoperatively was probably related to the increased metabolic demands of the patient. Gravity retards the flow of blood from the upper and lower extremities, either when the position of the extremity is changed or when the longitudinal axis of the entire body is altered. Fowler's position delayed the return of blood from the lower extremities. The ankle vein to carotid circulation rate was shortened by active motion of the foot or toes and by elevating the extremity.

Therapy of Obstruction of Small Intestine.—From June 1938 to April 1942, 130 patients with obstruction between the ligament of Treitz and the cecum were treated at the University of Minnesota Hospitals. The mortality in 110 was 15.5 per cent; the remainder were patients in whom obstruction of the small intestine was a minor incident in their death. At first it appears that less emphasis is being placed on conservative therapy at the clinic than was the case at the time of the last report in 1939. The reason for this, Dennis and Brown point out, is largely the success that has attended anastomosis in the presence of pronounced obstruction and intestinal gangrene, when performed by the closed technic. As the intestinal bacterial count can be reduced by the preoperative oral administration of succinylsulfathiazole in elective operations, the closed anastomosis with the local implantation of sulfathiazole finds its field of greatest usefulness in emergency obstruction cases. Only by the intelligent and combined use of the improved methods of intubation of the small intestine and of the newer surgical methods can further reductions in the 18 to 20 per cent mortality be accomplished. This is one fourth the mortality rate of two decades ago. Treatment consists in proper water and salt administration, decompression of the distended intestine by nasal tube or by catheter enterostomy if the tube is inadequate, parenteral administration of sugar, plasma and the like for a complete metabolic balance, resection of a gangrenous intestine and late operative restoration of intestinal continuity if the obstruction fails to relent spontaneously.

Conservatism in Surgical Management of Acute Regional Enteritis.—Smithy believes that radical treatment is not indicated for patients in whom acute regional enteritis is initially encountered at a laparotomy for an acute abdominal condition. Only the phase of regional granulomatous inflammation of the intestine which is acute or subacute when first seen and which demands celiotomy at the time of hospitalization is considered. The 5 cases of acute regional enteritis reported by him were managed by simple exploration and appendectomy, and in none has the disease progressed. A strong tendency toward spontaneous healing is present in certain instances of acute regional enteritis. In 1 of the cases prompt healing followed primary closure of a perforated cecum in the presence of an acute process. Progress from an acute to a chronic condition under observation and thorough preoperative preparation by general supportive measures, transfusions and enteral chemotherapy is far more desirable than radical resection without preparation in an acute case. Appendectomy is incidental in the conservative form of surgical treatment; if the appendix is not removed it is eventually involved by acute granuloma, which may cause appendical obstruction from edema with consequent early rupture and peritonitis.

Thymus in Myasthenia Gravis.—According to Sloan, the examination of 350 thymus glands, of which 150 were removed from patients dying suddenly, has confirmed the well known facts about the anatomy, histology and involution of the thymus. Fourteen of the 150 thymus glands contained lymphoid follicles with germinal centers in the medulla. The thymus glands of 10 patients with myasthenia gravis were no larger than many apparently normal glands. Examination of their thymus glands, none of which contained a tumor, removed at operation revealed that there was some age involution, an increase in the number of lymphocytes, in 7 an abnormal number of lymphoid follicles with germinal centers in the medulla, no epithelial hyperplasia and no constant change in the character and number of the Hassall corpuscles. At postmortem study there was no generalized lymphoid hyperplasia in the thymus glands from 6 patients with myasthenia gravis who had not been operated on. The thymus glands of 3 of 7 individuals with Addison's disease showed changes like those in myasthenia gravis. The glands of 5 acromegalic persons lacked involution; in addition 2 of the glands showed the changes found in myasthenia gravis. Of the 20 thymus glands examined from individuals with hyperthyroidism involution was lacking in 18, and in addition the changes in 5 were like those in myasthenia gravis.

Surgery, Gynecology and Obstetrics, Chicago

76:129-256 (Feb.) 1943

Correlation of Gastroscopic and Pathologic Findings in Gastritis. E. B. Benedict and T. B. Mallory, Boston.—p. 129.
Method of Colectomy for Desperate Cases of Ulcerative Colitis. H. Devine, Melbourne, Australia.—p. 136.
Postmetastatic Survival of Osteogenic Sarcoma. K. Speed, Chicago. —p. 139.
*The Gastric Mucosa as an Endocrine Gland. R. H. Abrahamson and J. W. Hinton, New York.—p. 147.
Surgical Treatment of Pilonidal (Dermoid) Cysts: Study of 100 Consecutive Cases of Excision and Primary Closure. S. C. Woldenberg and W. S. Sharpe, New Orleans.—p. 164.
Surgical Treatment of Infantile Hydrocephalus. T. J. Putnam, New York.—p. 171.
Nontuberculous Empyema Thoracis in Children. J. K. Berman, Indianapolis.—p. 183.
Injuries of Parietes and Extremities. S. L. Koch, Chicago.—p. 189.
Adenomyosis of Uterus. O. A. Brines and J. H. Blain, Detroit. —p. 197.
Rapid Preparation of Eyesockets. J. Penn and L. Brown, Johannesburg, South Africa.—p. 204.
Linitis Plastica Type of Carcinoma. O. Saphir and M. L. Parker, Chicago.—p. 206.
Total Abdominal Hysterectomy. H. L. Foss and J. R. Babcock, Danville, Pa.—p. 214.
Acute Suppurative Tenosynovitis of Hand. J. E. Flynn, Boston. —p. 227.
Modified Mikulicz Resection for Carcinomas of Colon. T. E. Jones, F. R. Bondi and R. E. Brubaker, Cleveland.—p. 236.
Volvulus of Sigmoid. D. Metheny and H. E. Nichols, Seattle.—p. 239.

The Gastric Mucosa as an Endocrine Gland.—Abrahamson and Hinton have followed 21 men and 4 women with roentgenographically positive peptic ulceration who were taking orally combinations of ½ to 1 grain (0.032 to 0.065 Gm.) of thyroid three times a day and 1/60 grain (0.001 Gm.) of thyroxine intravenously once a week. To confirm specifically the action of these drugs on the gastrointestinal mucosa and to eliminate a rise in the basal metabolic rate some of the patients were placed on dinitrophenol. At the end of three months 6 patients were cured, 4 both symptomatically and roentgenographically, and 5 were symptomatically improved but roentgenograms remained positive. During the following year 7 patients had a recurrence of acute symptoms and 1 a perforation. Several of these patients improved but later were unimproved and 2 came to operation. No difference was noticeable in those placed on thyroid and those placed on dinitrophenol. To ascertain the effect of estrogens on the activity of the gastric and the upper intestinal mucosa, 29 men with peptic ulceration of the duodenum were placed on various doses of theelin in oil. Thirteen to thirty-one intramuscular injections into the buttocks of 6,000 to 50,000 international units were given daily. The men were followed up for one to five years. The only conclusion to be drawn from this therapy was that it caused a higher percentage of remissions in chronic duodenal ulcer (which lasted five to ten months) than is usual in controls. Of greater importance than the subsidence of symptoms in 82.1 per cent is the healing of the duodenal lesion in 42.8 per cent. This change occurred (as evidenced roentgenographically) in the presence of definitely increased free and total acidity. The conception that the gastric mucosa is a gland is presented and therefore that it is liable to influences similar to those which control the function of other endocrine glands. There are decided differences in blood hormone content between the sexes. These differences help to explain the sex discrepancy and age incidence in gastric carcinoma and benign gastroduodenal lesions. Further clinical and experimental work along these principles may throw further light on the problems of etiology, diagnosis and therapy of gastric carcinoma.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Experimental Pathology, London

23:277-344 (Dec.) 1942

Hyaluronidase and Polysaccharide from Tumors. A. Pirie.—p. 277.
Disturbance of Nucleic Acid Metabolism Produced by Therapeutic Doses of X and Gamma Radiations: Part I. Methods of Investigation. J. S. Mitchell.—p. 285.
Id.: Part II. Accumulation of Pentose Nucleotides in Cytoplasm After Irradiation. J. S. Mitchell.—p. 296.
Id.: Part III. Inhibition of Synthesis of Thymonucleic Acid by Radiation. J. S. Mitchell.—p. 309.
Preliminary Description of Preparations of Some Viruses Causing Tobacco Necrosis. F. C. Bawden and N. W. Pirie, with an Addendum on Examination in Ultracentrifuge. A. G. Ogston.—p. 314.
Addendum: Examination in Ultracentrifuge. A. G. Ogston, with technical assistance by W. Weinstein.—p. 328.
Hippuric Acid Synthesis as Test of Hepatic Efficiency. J. B. Rennie.—p. 329.
Absence of Seasonal Influence on Rous No. 1 Sarcoma in Young Chicks. J. G. Carr.—p. 339

British Journal of Ophthalmology, London

27:49-96 (Feb.) 1943

Third Entity of Primary Symmetrical Fatty Corneal Dystrophy. J. A. Conway and A. Loewenstein.—p. 49.
Mustard Gas Keratitis Under Constant Observation for Period of Twenty Years: Case. T. L. de Courcy.—p. 54.
Hemangioma of Orbit Removed by Operation. T. Crawford, E. F. King and H. W. Rodgers.—p. 61.
Ocular Complications in Relapsing Fever. J. B. Hamilton.—p. 68.
Notes on Forms of Keratitis Presumably Due to Virus of Herpes Simplex. J. B. Hamilton.—p. 80.

British Journal of Urology, London

14:153-216 (Dec.) 1942

Posterior Wall of Prostate Gland. D. MacLeod.—p. 153.
Further Note on Tidal Drainage. C. Wells.—p. 172.

Lancet, London

1:97-128 (Jan. 23) 1943

Traumatic Hemothorax. A. T. Edwards.—p. 97.
Local Chemotherapy in Experimental Lesions of Eye Produced by Staphylococcus Aureus. J. M. Robson and G. I. Scott.—p. 100.
*Tropical Eosinophilia. R. J. Weingarten.—p. 103.
Hepatosplenomegaly with Other Clinical Reactions to Sulfapyridine. H. V. Williams.—p. 105.
*Red Cell Suspension Transfusions. L. Watson.—p. 107.
Pentothal Sodium Anesthesia for Cystoscopy. I. N. Blusger and J. H. Dixon.—p. 111.

Tropical Eosinophilia.—A new disease entity apparently peculiar to certain parts of India is described by Weingarten. The disease is characterized mainly by severe spasmodic bronchitis with paroxysms of coughing, leukocytosis, loss of appetite, loss of general strength and a decidedly high eosinophilia. At first (in 1934) an allergic state was thought the most likely explanation, but as more instances occurred the features of the disease argued against allergy. All but 3 patients seen during five years of consultant practice in Bombay lived near the sea. Not a single instance of the disease has been encountered by the author among the stationary inland population of India, which has a dry climate with extremes in summer and winter. Though often the disease lasts for years, it is benign. There has been no opportunity to study a case at necropsy. Previously the diagnosis and treatment were either for pulmonary tuberculosis or chronic bronchial asthma. Only a leukocyte and a differential count can confirm or exclude the disease. In 1936, 1 of the patients already under observation contracted syphilis and neoarsphenamine was given. His leukocyte count after four injections had fallen from 64,200 to 7,800 and the eosinophils had decreased from 71 per cent to 16 per cent. His subjective symptoms also vanished. But not until 1938 was it realized that this was no coincidence and since then patients have been systematically treated with neoarsphenamine, which proved to be a quickly acting specific. Injections were given every fourth day usually in a course of six: two each of 0.15, 0.3 and 0.45 Gm. The drug was dissolved in a 10 per cent solution of calcium gluconate to which 2 cc. of a preparation of ascorbic acid was added. No untoward reactions were noticed. After the first two or three injections there is a tendency for a further slight increase in the total leukocyte count as well as in the percentage of eosinophils; later they diminish abruptly, in some even before five or six injections have been given and in others only after the end of the course. Clinical symptoms usually completely disappear after the third injection. Patients treated in this way continue in good health.

Erythrocyte Suspension Transfusions.—Transfusion of the erythrocyte suspensions prepared from the blood cells that remain after the plasma is removed is stated by Watson to be extremely useful in increasing the oxygen carrying capacity of the blood. Forty-six transfusions of the erythrocyte suspension have been given to 22 adults with anemia after hemorrhage, pernicious anemia, renal calculus, aplastic anemia, acute hemolytic anemia and chronic anemia. Patients usually reported that they felt better, had more energy and took a greater interest in their surroundings. The patients appeared to derive as much benefit (judged clinically) from an erythrocyte suspension transfusion as from a whole blood transfusion. No simple relationship held between the concentration of the erythrocyte suspension and the expected rise of hemoglobin in the recipient, but when the aim of the transfusion was to increase the oxygen carrying power of the blood the benefit derived from a transfusion, in any 1 instance, was directly related to the erythrocyte content of the fluid transfused. Group O blood should be used for making the suspensions, especially when such erythrocytes are available as a by-product of blood plasma separation. Suspensions should not be warmed before administration. A Riddell's pump should be utilized when concentrated suspensions are transfused. The maximum transfused to any outpatient should not exceed 1,000 cc. on any one occasion. When a large volume of group O erythrocyte suspension transfusions are administered to patients with other than group O blood, the risk of a reaction due to the transfusion of large quantities of isoagglutinin is reduced. The utilization of the suspensions for transfusion should reduce the calls made on blood donors.

Medical Journal of Australia, Sydney

1:1-22 (Jan. 2) 1943

*Experiences of Salt Deficiency. J. M. Flattery.—p. 5.
*Potato Diet in Peptic Ulcer. L. J. J. Nye.—p. 7.

Experiences of Salt Deficiency.—Flattery's studies of two years of an illness in navy men following exposure to a high atmospheric temperature, attributed to a salt deficiency through excessive and profuse sweating in a hot, humid, windless, enervating climate of the tropics, show that actually, even at rest (and apart from personnel working in the engine and boiler rooms), every person has periods of profuse and continuous sweating. The types of illness encountered were heat exhaustion, gastrointestinal illness and heat cramp. Sodium chloride to be of any use must be taken as an organized prophylactic measure and rigidly adhered to. The practice was instituted that every officer and man on the ship should take ½ teaspoon of salt in water twice a day. On one ship the experiment of putting salt in the drinking water was bitterly resented. The educational method was much better. No ill effects of heat occurred when the routine was faithfully carried out. When salt was administered to affected patients, the response to treatment was almost immediate. The taking of ½ teaspoon of salt in water twice a day should be instituted for all ships serving in the tropics, for ships during their passage through tropical areas (especially troopships) and also for all personnel living and stationed in tropical areas ashore.

Potato Diet in Peptic Ulcer.—With the exception of the relatively few persons who are allergic to it, potato is an ideal food for patients with peptic ulcer. According to Nye, potatoes possess excellent food qualities; their caloric value is 25 calories per ounce (old, boiled potatoes), while that of milk is 19 calories per ounce. They are rich in minerals and in vitamins A, B_1 and C. The vitamin C content, which is greater than that of milk, makes potatoes especially valuable in the treatment of ulcer, since vitamin C exerts an important healing influence on wounds. Potatoes have an alkaline reaction and therefore assist in the neutralization of acid. When mashed with milk and butter potatoes form a bland, palatable food, which to most patients is a welcome addition to the usual list of monotonous milk foods. In the first stage the author advises two or more

potato feedings daily, depending on the choice of the patient. For the patient's permanent diet potatoes should, as much as possible, be substituted for bread, which has an acid ash (white bread contains 4 cc. of tenth normal acid and wholemeal bread 17 cc. per ounce). Many patients who were intolerant to milk have been successfully treated with a diet consisting mainly of potatoes. Potatoes are digestible. The popular fallacy that the skin of the potato contains most of the vitamins is erroneous. Recent investigation has shown that these increase in quantity toward the center of the potato. Of importance is the fact that much more food value is retained in the potato when it is baked in the skin.

Presse Médicale, Paris

50:217-240 (Feb. 25-28) 1942

*Sensations Provoked After Amputation and in Hemiplegia by Sympathetic Anesthesia and by Intra-Arterial Injection of Procaine Hydrochloride in Relation to Phantom Limb. R. Leriche.—p. 217.
*Nervous Accidents of Artificial Pneumothorax: Segmental and Distal Paralysis: Sequel of Hemiplegia of Pleural Origin. J. Vidal.—p. 217.
Traumatic Sciatica: Frequency, Treatment and Medicolegal Consequences. S. de Sèze.—p. 219.
Small Epidemic of Bouillaud's Disease. C. Blancardi and A. Simonel. —p. 222.

Sensations Provoked in Phantom Limb and in Hemiplegia.—Leriche reports 3 cases in which anesthesia of the sympathetic or intra-arterial injection of procaine hydrochloride provoked peculiar sensations. The first patient had undergone amputation of a hand in 1917. He experienced hallucinations of pain in 1937, after twenty years of normal life, during which time he had never had perceptions of the absent hand and wrist. The stump was cold. The terminal cicatrix, slightly below the middle third, was soft and not indurated. There was no definite neuroma, but palpation of the median and cubital nerve terminations was painful. Infiltration of the stellate ganglion with procaine hydrochloride was followed by a feeling of heat which descended down the arm, the forearm and into the hand. The patient was surprised to feel his hand hot and burning. The sensation subsided after a short while, but on the following day and on the day after, when infiltration was repeated, the same sensations were experienced. The second patient had had his arm amputated in its superior third. He complained of excruciating pain on the inner aspect and the fingers of the absent hand. Intra-arterial injection of procaine hydrochloride produced a feeling of heat in the hand, and the patient had the sensation as if movements of the fingers were interfered with by a swelling. The third patient, a man with hemiplegia, complained of a painful anesthesia and contracture. Following injection of procaine hydrochloride into the subclavian artery he experienced a sensation of heat in the arm, forearm and hand and two hours later was free from pain. Injection of procaine hydrochloride into the femoral artery was followed by a similar sensation of heat in the thigh, leg and foot, along the exact course of the arteries. This is a curious phenomenon in a person with hemiplegia, although otherwise the sensation would be normal. The author concludes that these cases suggest a new approach to the study of deep sensitiveness.

Nervous Accidents of Artificial Pneumothorax.—Vidal points out that statistics on nervous accidents complicating the induction of artificial pneumothorax are quite contradictory. They vary from 0 to 20 per thousand. Analysis by Vidal of fifteen statistical reports published between 1921 and 1937 and listing 153 accidents in a total of 419,029 pleural insufflations yielded the figure of 0.36 per thousand. Reports regarding their severity likewise vary, some giving a mortality rate of 7.9 per cent and others of 16.6 per cent. The author reports 7 instances of nervous complications in a total of 8,000 insufflations. This is an incidence of 0.87 per thousand. One of the 7 resulted in a fatality, giving a mortality rate for this group of 14.2 per cent. The first patient, a girl aged 18, had had an effective pneumothorax on the left side which had been maintained for three years. Involvement of the other lung made advisable induction of pneumothorax on the opposite side. Two attempts at insufflation of the right side resulted in a generalized epileptic crisis. There were 2 other cases in which induction of pneumothorax brought on a generalized epilepsy. One patient developed localized epilepsy and 3 hemiplegia. One of the latter patients died.

Helvetica Medica Acta, Basel

9:531-694 (Sept.) 1942. **Partial Index**

Sulfonamide Therapy in Obstetrics. V. C. Brunner.—p. 543.
Clinical Results of Sulfonamide Therapy in Obstetrics and Gynecology. W. Geisendorf.—p. 566.
*Sulfonamide Therapy in Gynecology. V. R. Wenner.—p. 577.
Development of Evolutive Forms of Thrombocytes Within Twelve Hours After Withdrawal of Blood in Dark Field Native Preparation. J. A. Schwendener.—p. 609.

Sulfonamide Therapy in Gynecology.—Wenner reviews the results obtained with sulfonamide compounds in gynecologic hospitals of Switzerland. The effects in the treatment of uncomplicated gonorrhea were excellent. In the complicated cases the adnexal lesions were only slightly influenced although the gonococci disappeared as rapidly as in the simple cases. In nongonorrheal adnexal inflammations the therapeutic results were difficult to estimate; they did not seem to be considerable. The sulfonamides produced some favorable results in gynecologic operations. The prophylactic application in the operative field of infected or presumably infected patients has given good results. The effects of the sulfonamides have been favorable in the prevention of postoperative cystitis. The improvement obtained in febrile abortion was not striking. Sulfonamide therapy proved effective in counteracting the fever following radium insertion for carcinoma.

Schweizerische medizinische Wochenschrift, Basel

72:957-996 (Sept. 5) 1942. **Partial Index**

Significance of Canned Food for Physiology of Nutrition. A. Fleisch.—p. 957.
Feeding of Healthy and Sick Infants During War. G. Fanconi.—p. 958.
*Problem of Protein Supply During War. A. Jung.—p. 964.
Condensed Milk. C. Zbinden.—p. 968.
Condensed Milk in War Diet. M. Guigoz and A. Jaton.—p. 970.
*Canned Fruits and Vegetables. Laboratory of Canning Factory in Rorschach.—p. 972.
Norwegian Canned Fish. F. Jakobsen.—p. 975.
Cocoa and Chocolate. C. del Boca.—p. 976.
*Should Soy Beans Be Cultivated in Switzerland? G. Moser.—p. 979.

Problem of Protein Supply During Wartime.—According to Jung the daily protein requirement is between 80 and 120 Gm. and accounts for from 12 to 16 per cent of the calories. Persons who consume a relatively low number of calories usually take a higher percentage of protein, because a person strives instinctively to take in not less than 80 Gm. of protein. Most of the animal proteins not only are of relatively high value but also improve the taste and the satiating effect of food. The animal proteins should supply, if possible, 50 per cent of the human protein intake. Animals concentrate the vital amino acids from large quantities of feed; however, the production of animal proteins involves great losses of food substances. Hogs return only from 25 to 30 per cent of the calories and chickens even less. Today many products which in normal times were waste must be utilized for human consumption. In this connection the author mentions the blood of slaughtered animals, skimmed milk and its products and grades of potatoes otherwise fed to animals. A dry preparation can be made from animal blood which is suitable for human consumption. Cheese from skimmed milk can now be processed in a more satisfactory manner. If Switzerland is to become entirely self sustaining on its rather limited acreage, proteins for human consumption must be obtained from products hitherto considered suitable only for the feeding of animals. In this connection the author calls attention to an early cut and rapidly dried clover. This clover has a high protein content. Experiments on rats proved that on a diet of bread and clover meal the animals thrived even better than on a diet of bread and skimmed milk. This indicates that it is not entirely a problem of protein but that vitamin A or E may account for the more favorable effect of the clover. Much would be gained if the clover meal could be utilized for human consumption because a hectare (2.47 acres) of land will yield 1,500 Kg. of protein if planted with this clover, only 240 Kg. of protein if planted with cereal grains and even less if planted with potatoes. On the other hand, intensive utilization of soil requires crop rotation and this will protect the population against a too onesided diet.

Canned Fruits and Vegetables.—There is no complete agreement so far on whether canned foods have the same value as fresh foods. The question of the vitamin content is of particular interest. This report presents an investigation of the problem. Cans are made of steel plate covered on both sides with a thin layer of tin. The opinion prevails that comparatively large quantities of tin are dissolved in the conserved food and exert a harmful effect on the human organism. The inside of the can often shows discolored streaks particularly in the case of vegetables with high protein content (peas and beans). The tin is attacked by amino acids and sulfur compounds which are split off from the vegetable proteins. In this process smallest traces of the metal are being dissolved in the vegetable fluid, but they have no influence on the human organism. If the quantity of dissolved metal becomes larger it gives the product an unpleasant metallic taste, but even such food is not injurious to health, because tin is a nonpoisonous metal. Animal experiments with canned food containing large quantities of tin demonstrated the harmlessness. No cases of poisoning are known that could be traced to the tin content of cans. Studies on the vitamin A or carotene content revealed that these substances are only slightly impaired by canning and storage. Experiments on the vitamin B_1 content disclosed a maximal loss of 17 per cent in canning. The vitamin B_2 content of vegetables is not at all impaired by the canning process. Vitamin C is water soluble and, particularly in alkaline solution, it is readily oxidized. Vitamin C is better preserved in those foods in which the juice has an acid than in those in which the juice has an alkaline reaction. Enzymes present in fresh vegetables have a destructive effect on vitamin C after harvesting. For this reason it is important that canning be done immediately after harvesting. In canned fruits vitamin C is preserved to a considerable extent, but in vegetables the loss is higher. The vitamin D content of vegetables is slight and therefore can be disregarded in the consideration of the canning process. Vitamin E has a high resistance to oxygen and to heat and presumably is not lost during canning. Canned foods promote health and are capable of protecting the organism against avitaminoses. The protein fat and sugar contents of fruits and vegetables are influenced by canning in about the same manner as by ordinary cooking; that is, the loss in these substances is negligible.

Advisability of Planting Soy Beans.—According to Moser, cultivation of soy beans gives promise of making Switzerland self sustaining during the war. Three years of observation have convinced him that if the right variety of soy bean is chosen and if it is properly treated, the cultivation will be successful, because soy beans will grow wherever grapes, maize and wheat will grow, up to an altitude of 700 meters. Climate is not the only decisive factor; the type of soil must also be considered. Acid and moist soils with a p_H of less than 6 are not suitable. Agricultural experimental stations should investigate what varieties are most suitable for Switzerland. Bacteriologists should develop a nitrificating vaccine, like the German preparation "radizin," which stimulates the development of root nodules. The farmer should be given necessary information regarding soy bean cultivation, preparation of the soil, fertilization, inoculation of the seed, time, distance and depth of planting. In view of the shortage of agricultural labor, it should be emphasized that cultivation of soy beans can be done entirely with machines. The fact that soy beans require no nitrogen fertilization but, on the contrary, introduce nitrogen into the soil will be an added inducement. Potassium and phosphorus are the only fertilizers needed. The author concludes that introduction of the soy bean will cause as much change and improvement in human nutrition as did the introduction of potatoes two hundred years earlier.

Pediatria e Puericultura, Bahia

11:137-176 (June) 1942. **Partial Index**

*Familial Placement of Minors. A. Bahia.—p. 137.
*Sulfanilamide in Therapy of Glomerulonephritis. E. Athayde.—p. 165.
Staphylococcic Empyema. J. Peróba.—p. 171.

Familial Placement of Infants and Minors.—Bahia reviews the history of familial placement of infants and minors and discusses indications and physical, moral and educational advantages of such a placement. The system does not always represent an ideal solution of the problem of taking care of infants or minors as well as of mothers. The natural and most human solution of the problem will be the one which does not separate the mother from her child. The solution gives rise to several problems, which should in their turn be solved by the government or by the social service. Solution of the new problems is mainly concerned with giving parents medical care or means of earning money and work and moral aid to unwedded mothers.

Sulfanilamide in Glomerulonephritis of Children.—Athayde reports encouraging results from the use of sulfanilamide in 20 cases of glomerulonephritis in children. The drug was administered in doses of 1 Gm. daily. Fever and edema disappeared within three days, and the urine became normal. The drug was well tolerated.

Revista de la Policlínica Caracas, Caracas

11:229-292 (Sept.-Oct.) 1942. **Partial Index**

Gastroduodenal Ulcers: Clinical and Roentgen Study of Cases Seen in Caracas. H. A. Landaeta.—p. 238.
*Ascorbic Acid (Vitamin C) in Therapy of Pulmonary Tuberculosis. J. Roldán.—p. 261.

Ascorbic Acid in Pulmonary Tuberculosis.—Roldán advises the administration of ascorbic acid in pulmonary tuberculosis, especially in rapid loss of weight, frequent attacks of fever, in the course of tuberculin and gold therapy, after operations and in pregnancy. The substance should be administered intravenously in daily doses of from 100 to 300 mg. up to normalization of the ascorbic acid content of the blood. After the discontinuation of the ascorbic acid therapy the patient should receive liberal amounts of fruit juices, especially orange, lemon and tomato juices.

Semana Médica, Buenos Aires

49:1201-1260 (Nov. 19) 1942. **Partial Index**

Biostatistics on Sixth Outbreak of Acute Poliomyelitis in Rosario. P. P. Piñero Garcia.—p. 1209.
Anesthesia of Stellate Ganglion. E. Lluesma Uranga.—p. 1220.
*Hormones in Treatment of Cardiac Neuroses. E. F. Diaz Mindurry.—p. 1230.
Acanthosis Nigricans and Sympathetic Nervous System. F. F. Gunche, L. Iapalucci and R. Troncoso.—p. 1237.
Pulmonary Abscess: Importance of Its Classification. A. Halperin.—p. 1242.
Rheumatism and Its Relations to Microclimate of Dwellings. B. A. Moreno.—p. 1244.
*Cod Liver Oils: Possibility of Replacing Them By Argentine Products. C. A. Grau.—p. 1248.

Hormones in Treatment of Cardiac Neuroses.—Díaz Mindurry investigated 8 cases of cardiac neurosis. Hormones given to these patients for endocrine disturbances exerted a favorable influence on their neurocardiac symptoms. The author directs attention to the importance of endocrine equilibrium. A woman aged 37, who had undergone a hysterectomy and bilateral oophorectomy, complained of repeated attacks of palpitation and feared serious heart disease, although cardiologic examination disclosed no anomaly. Treatment with estradiol counteracted the cardiac symptoms. Several other cases are reported in which the administration of gonadal or thyroid preparations improved existing cardiac symptoms.

Vitamin Content of Cod Liver Oil and Possible Substitutes.—Grau determined the vitamin contents of cod liver oil preparations available in Argentina. He lists the vitamin A contents of thirty samples obtained on the market and shows that only nine of these had the 600 international units per gram which is the minimum requirement according to the pharmacopeias of the United States and France. The author stresses that, because the war is curtailing the import of cod liver oil from the usual sources, efforts must be made to supply the needs of Argentina from fish oils available at home. He shows that it is possible to obtain liver oils with high vitamin A content from sea bass, sole, rays and sharks, to mention only fish livers sufficiently large to justify industrial utilization. It has been shown that oils obtained from the livers of these fish contain between 900 and 2,800 international units of vitamin A per gram. To make possible the effective utilization of the liver oils of the aforementioned fish, the fisheries of Argentina must be better organized and it must be made obligatory to sell these fish only after evisceration.

Book Notices

Services to the Orthopedically Handicapped. A Report of a Study Made Under the Auspices of The Trustees of the Widener Memorial School for Crippled Children and the Board of Public Education, School District of Philadelphia. Louis P. Hoyer, Director of Study, and Charles K. Hay, Assistant Director of Study. Boards. Price, 50 cents. Pp. 115, with illustrations. Philadelphia, 1942.

This volume is a report of a study of services to the orthopedically handicapped made under the auspices of the Trustees of the Widener Memorial School for Crippled Children and the Board of Public Education School, District of Philadelphia. The work should be of major interest to persons engaged in vocational training or guidance and will be of minor interest to orthopedic physicians.

The authors discuss certain fundamental principles of vocational training and guidance for the orthopedically handicapped and set forth recommendations for improving programs for the physically handicapped. Although the subject matter may have general application, the authors devote most of their discussion to local problems of rehabilitation in and around Philadelphia. The reader is impressed that the authors are striving to effect improvements in the educational and vocational guidance system for the physically handicapped. These changes have a bearing on state and municipal legislation. The essentiality of having well qualified persons engaged in vocational guidance and rehabilitation and further the necessity of establishing well organized central administrative offices to carry out the operation of the programs is stressed.

In their approach to the problem of rehabilitation of the handicapped, the authors' philosophy is sound. It places the emphasis on making the handicapped person self reliant, cooperative and capable whenever possible of competing with other persons on an equal basis. Subjective considerations based on sympathy for the handicapped are not emphasized; instead the emphasis is placed on the duty of society to offer facilities to the handicapped which will enable them to become socially and economically efficient members of a democratic society on their own merits. In other words the overall objective of the authors is to create a condition whereby adjustment is made in the case of the orthopedically handicapped to bring them whenever possible up to the standards of the normal group.

In the summary appearing at the end of the book, certain specific and important recommendations are listed which could well be adopted as criteria or norms for any broad program relating to the rehabilitation of the orthopedically handicapped. Of interest among these recommendations is the one dealing with provision for psychologic services to the handicapped—a type of service which has not always been given its proper important place in organized rehabilitation programs throughout the country.

Another important recommendation is that dealing with the type of instruction given under secondary education and adult education whereby the handicapped are provided instruction not only in the broad fields of education but also in specific skills that are required for jobs available to the orthopedically handicapped. The importance of this latter recommendation is apparent, since it is fundamental in at least affording an approach for the handicapped in achieving economic security or complete adjustment.

Familial Nonreaginic Food-Allergy. By Arthur F. Coca, M.D., Medical Director, Lederle Laboratories, Pearl River, New York. Fabrikold. Price, $3. Pp. 160, with 13 illustrations. Springfield, Illinois and Baltimore: Charles C Thomas, 1943.

There is a large group of cases of food allergy in which the usual cutaneous tests do not aid in the diagnosis; many of the cases, in fact, present symptoms and syndromes which heretofore have not been recognized as allergic. These clinical conditions are herein grouped into a new category, which the author calls "familial nonreaginic food allergy," an unsatisfactory term offered only for the purpose of discussion and on the advice of a small group of allergists. Familial nonreaginic food allergy differs from the atopic category in that the hereditary influence is independent of the atopic inheritance, the allergic antibodies are not demonstrable as they are in the atopic group (bronchial asthma, hay fever and atopic dermatitis), many of the symptoms are not represented in the atopic group, and the allergic reaction practically always causes acceleration of the pulse rate. The importance of the new category is obvious in view of the author's estimate that at least 60 per cent of the population at times have clinical manifestations of food allergy. This book describes a new, accurate and comparatively simple diagnostic method by means of which one can determine which symptoms and syndromes are food allergic. The author places the patient on a sharply restricted trial diet for four days in order to establish the nonallergic range of the pulse rate. Other foods then are systematically added to the diet, one after another, and their effect on increasing the pulse rate is carefully recorded. No food allergic range of the pulse of less than 22 beats per minute was observed in adults in cases under observation for at least five days. It was possible in most of the 51 cases studied to determine in the individual case all of the foods and other excitants of this category of allergic disease. Without exception in the first 44 cases in which the dietary treatment was completed, when the pulse rate reached the level in range recognized as normal for the individual the chief symptoms complained of completely disappeared and with them disappeared other symptoms which had not previously been considered allergic. When fully confirmed by other investigators, this diagnostic method and the dietary treatment of familial nonreaginic food allergy controlled by the pulse rate will broaden and perhaps tend to clarify the field of food allergy.

Le problème du cancer. Par Charles Oberling. Collection "France Forever" sous la direction du Professeur Henri Laugier. Paper. Pp. 298. New York: France Forever; Montreal: Les Éditions de L'Arbre, 1942.

This is a well written account of the research into the fundamental nature and causes of cancer. It does not take up the control, diagnosis or treatment of human cancer. The main part of the book is devoted to experimental cancer (one hundred and eighty-six pages). The other parts discuss the reasons for our interest in cancer, the evolution of the ideas about the nature of cancer, the theories of cancer and, in conclusion, the question whether there are many cancers. The part on experimental cancer reviews the transplantation of cancer and the induction of cancer by various procedures and means. Unexpectedly, hardly anything is said about the cultivation of cancer cells outside the body or about the permanence of the change that takes place in a cell when it becomes cancerous and the transmissibility of that change to its descendants, generation on generation, apparently without the continued presence of the carcinogenic agent. The last section is a skilful, comprehensive and withal reasonable augmentation in favor of the "virus theory of cancer" as opposed to the view that cancer is not an etiologic entity but an irreversible cellular reaction to various agents of diverse origin. The book is a striking example of literary skill and clarity in scientific writing, and it will be read with profit by any one interested in fundamental cancer research. A good index would have increased its usefulness.

Mortalidad materna: Estudio sobre 61,684 partos ocurridos en la Clínica "Eliseo Canton" [años 1901 a 1940]. Por el Dr. Charles Roust. Tesis del doctorado en medicina, Universidad nacional de Buenos Aires, Facultad de ciencias médicas. Paper. Pp. 263. Buenos Aires, 1942.

Today, when a cultural and sanitary unity of all countries of the American hemisphere is of fundamental interest, this monographic study is most timely, for in it the reader will find detailed statistics on maternal mortality in the largest Latin American metropolis during the last four decades and an accurate analysis of the reasons for its sharp decline—from 22.16 per thousand deliveries in 1901 to 3.37 per thousand in 1940. The greatest drop is due to the controlling of trauma and toxemia and, to a lesser extent, of hemorrhage and infection. For instance, death as a result of obstetric trauma was reduced from 6.65 to 0.81 per thousand, that due to infection from 6.17 to 2.82 per thousand. All the other contributing factors, such as nationality, evolution of gestation, pelvic deformities and length of labor, are carefully analyzed. Tables and graphs add a great deal to the clarity of the thesis. This is a book that both the public health man and the obstetrician should read with considerable interest.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

FIRST AID TREATMENT OF BURNS

To the Editor:—**Would ordinary lubricating jelly have any merit in the first aid treatment of burns? It is sterile and nongreasy. It is water soluble, is easily removed and hence can be followed by any type of definitive treatment. Sulfonamide drugs can readily be added to this preparation. The aromatic substances usually included could be omitted.**

Lieutenant, MC-V(S), U.S.N.R.

ANSWER.—It is doubtful that ordinary lubricating jelly would have much merit in the first aid treatment of burns. The best first aid treatment is either to leave the patient's clothes on until a recognized type of management can be applied later or to wrap the burned areas in sterile sheets or dressings until the time for such a subsequent treatment. The difficulties of exposing the patient preparatory to applying lubricating jelly would consume valuable time and cause additional discomfort which would not be compensated for by any great advantage gained.

The fact that the jelly is water soluble is not as great an advantage as it would have been in the days when tannic acid was more universally used. The recent development of the petrolatum gauze-pressure dressing method of Koch and Reid as well as recent evidence for the toxicity of tannic acid has caused the pendulum to swing away from the tanning methods of local therapy.

Finally, recent experience gained in Boston seems to favor the use of sulfonamides by mouth or parenterally, rather than locally, in the treatment of burns. It is quite true, however, with regard to the latter point, that modifications of the Pickrell method of burn therapy still enjoy considerable vogue.

References:

Erb, I. H.; Morgan, E. M., and Farmer, A. W.: The Pathology of Burns: The Pathologic Picture as Revealed at Autopsy in a Series of 61 Fatal Cases Treated at the Hospital for Sick Children, Toronto, Canada, *Ann. Surg.* **117:** 234 (Feb.) 1943.

Harkins, Henry N.: The Treatment of Burns, Springfield, Ill., Charles C Thomas, 1942.

PARAVERTEBRAL ALCOHOLIZATION FOR ANGINA PECTORIS

To the Editor:—**Will you please describe paravertebral alcoholization of angina pectoris? Is it effective or beneficial?**

M.D., Illinois.

ANSWER.—The best description of paravertebral alcoholization of angina pectoris is that published by James C. White and Reginald H. Smithwick in the second edition of their book "The Autonomic Nervous System," published by the Macmillan Company in 1941, page 443. They have summarized the results in 67 cases of intractable angina pectoris. Complete or nearly complete relief was obtained in nearly 52 per cent, reduction of severe attacks to a mild form which can be treated satisfactorily by routine medication was obtained in 35.5 per cent, results were unsatisfactory in 9.5 per cent and death occurred within two weeks of the injection in 8 per cent. In obstinate intractable angina pectoris, this method of therapy may be recommended.

BLACK WIDOW SPIDER BITES

To the Editor:—**During the past four years I have had occasion to treat about fifteen black widow spider bites. All patients were seen within a few minutes of the bite and the only treatment used was the application of a flaming match head. No symptoms of any kind followed this treatment. Previous to this time my patients usually had a bad time for two or three days regardless of the treatment used. I should like to know if there has been any scientific work done to prove this line of treatment or if these spiders have suddenly become nonpoisonous.**

M.D., California.

ANSWER.—The bite of the black widow spinder does not always produce the characteristic symptoms of poisoning, since the emptying of the poison glands is under the control of voluntary muscle. A series of 15 cases of bite without symptoms is quite remarkable. Cauterization, both with heat and with various chemicals, has been tried repeatedly in treating spider bite poisoning, usually after the symptoms had developed, however, without apparent effects on the systemic manifestations and with frequent production of local complications. Burnt wood or charcoal might absorb some of the poison if actually applied at once, but not after the poison has had an opportunity to spread in the tissues near the site of the bite. If the experience of the inquirer can be repeated it warrants further investigation, as the black widow spider is still highly poisonous though rarely fatal. Meanwhile, avoidance of exposure to the bite and control of the symptoms by the injection of calcium gluconate, or with serum, should not be neglected.

References:

Bogen, Emil: Arachnidism, THE JOURNAL, June 19, 1926, p. 1894.

Gilbert, E. W., and Stewart, C. M.: Effective Treatment of Arachnidism by Calcium Salts, *Am. J. M. Sc.* **18:** 532 (April) 1935.

MASSAGE FOR ADIPOSE TISSUE

To the Editor:—**I have received several inquiries about the possible damaging effects of massage for the local reduction of fat, particularly in the thighs and abdomen. One patient was told by a physician that the "lymphatics and liver" suffer as a result of the breaking up of the fat. Is there any authoritative information on the truth or falsity of this claim?**

Harold E. Simmonds, M.D., Woodhaven, N. Y.

ANSWER.—As far as can be determined, there is no evidence available that massage "for the local reduction of fat, particularly in the thighs and abdomen," will do any particular damage to normal lymphatics or to the liver. It has been pointed out that the employment of massage is contraindicated in the presence of acute phlebitis, thrombosis or lymphangitis. The arguments against the employment of massage for local reduction of adipose tissue are not so much because of the dangers of the procedure as because of its futility. There seems to be a general misconception concerning the effect of massage on adipose tissue. Commonly it is believed that heavy massage can be employed to remove deposits of fat in various regions of the body. Clinical observation has not supported this conception.

When Carl Rosenthal investigated this problem experimentally (Die Massage und ihre wissenschaftliche Begrundung, Berlin, 1910) he was able to demonstrate that vigorous massage of the abdominal walls of animals produced no destructive effect whatever on the adipose tissue. Following very heavy massage, he made microscopic sections of the adipose tissue which showed no changes in the fat although the pressure had been sufficiently severe to produce multiple hemorrhages. The studies of Rosenthal seem to indicate the futility of attempting, by means of massage, to reduce local deposits of fat.

It can be concluded, therefore, that in normal persons heavy massage to the thighs or abdomen would probably do little damage to the lymphatics or liver but that the procedure would be futile as far as its effectiveness in removing deposits of adipose tissue is concerned.

ORAL DESENSITIZATION TO DUST

To the Editor:—**Can you give me some information on oral desensitization to dust? What sort of a preparation is used and where can it be obtained? Also what dosage should be used? When a maximum is reached, how often must a maintenance dose be given?**

M.D., Illinois.

ANSWER.—It is doubtful whether oral desensitization to dust would be effective, since oral pollen therapy has brought few results. The efficacy of the administration of dust in this manner is also questionable. There is no approved preparation for this type of therapy. If the inquirer wishes to experiment, such a product could undoubtedly be easily made.

ODOR ASSOCIATED WITH ADVANCED CANCER

To the Editor:—**In The Journal, March 27, 1943, page 1116, Dr. Edward T. Quinn's query regarding methods of coping with the bad odor associated with (advanced) cancer is answered by reference to the use of (*a*) chlorinated lime and (*b*) suction through a deodorant solution to deodorize the air of the room. The latter suggestion may refer to the instrument known as the "Claritor," manufactured by the General Electric Company. A recent improvement is the "Connor Odor Adsorber" by the same company. It may be helpful to Dr. Quinn to point out that treatment directed to the source of the odor rather than to the air of the room is more logical and usually more effective. In some instances merely increasing the frequency with which local dressings are changed is sufficient to reduce odor. In most cases secondary infection by putrefactive anaerobic organisms is responsible for the offensive odor. The following medicaments applied as local dressings have proved valuable in eliminating or greatly reducing such odors: (*a*) zinc peroxide (medicinal) cream, (*b*) urea solution 2 per cent, (*c*) lactose in saturated solution. The use of powdered sulfathiazole is also worthy of trial. It should be noted that elimination of secondary infection not only eliminates odor but often greatly relieves pain.**

Morton L. Levin, M.D., Albany, N. Y.

Assistant Director, Division of Cancer Control, State of New York Department of Health.